HUGH OWEN THOMAS

SIR ROBERT JONES

JOHN RIDLON, M. D.

Fig. I. Thomas wearing the famous peaked cap. (From McMurray, T. P.: *The Life of H. O. Thomas*, Saml. Hill & Sons, Liverpool, 1935.)

On the Contributions of

Hugh Owen Thomas of Liverpool

Sir Robert Jones of Liverpool and London

John Ridlon, M.D., of New York and Chicago

to

MODERN ORTHOPEDIC SURGERY

by

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With a Supplement on

RIDLON AND HIS SHARE IN MOULDING ORTHOPEDIC SURGERY

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Preface

IT USED TO BE a custom of Dr. John Ridlon, Professor of Orthopedic Surgery at Northwestern University, to initiate his candidates for post-graduate study by having them read a book written by Hugh Owen Thomas of Liverpool, on *Intestinal Obstructions*. Dr. Ridlon said that any doctor who mastered this book had learned the importance of rest in the treatment of disease, and some of the methods of securing rest for damaged and diseased structures.

Dr. Ridlon had visited Thomas in Liverpool on two occasions—once while he was still in New York (1887), and again in 1890. In fact, the transfer of Ridlon from New York to Chicago, in 1889, came about because of a controversy with Dr. Shaffer over the application of a Thomas splint and Thomas' principles in the treatment of a case of tuberculosis of the hip. There can be no doubt that Ridlon understood and applied the Thomas apparatus more efficiently than most of his contemporaries. From him many of us learned about those fundamentals—treatment by rest, fixed traction, healing in correct position, and preservation of function—that are so necessary to the conscientious orthopedic surgeon.

It is our intention to recall Thomas' teachings and

the manner in which those teachings were employed by Ridlon. We have made extracts from Thomas' writings, and our comments have been designed to correlate them with present practice. We hope this plan may have a wide reception by present and prospective orthopedic surgeons, and that it may have a definite influence upon future practice, as we feel it should.

As former pupils of Dr. Ridlon, and as orthopedists who have felt the influence of Thomas' famous nephew, Sir Robert Jones, we feel that we may undertake to lay before the orthopedic surgeons of the present generation, Thomas' teachings and practice in a way that will make them both interesting and useful in this second period of post-war training in which so many surgeons are now engaged.

When Dr. Ridlon was seventy-eight years old, that is in November, 1930, he wrote that he was working on a book dealing with Hugh Owen Thomas. Among other things he said, "My work on Thomas' book comes on very slowly. It may never be printed if Sir Robert objects. I am trying to find some pictures of Thomas, especially one with Hilda Jones on his shoulder, or in his arms, showing a happier face than do his usual pictures.[1] My endeavor will be to have an introductory chapter of my impressions on my two visits to him. Sir Robert will write the Foreword, then I am to cull the essence of his principles, and the minute details of his practice. I am not yet decided whether to put the matter in the order of the seven books (of Thomas) I have, or to scramble the whole, and try to put it in proper order."

Mr. McCrae Aitken, Mr. T. P. McMurray, and other writers, have made apologies for Mr. Thomas

[1] Hilda Jones married Frederick Watson.

as a teacher, and have credited Sir Robert Jones with having explained and popularized the methods and technics for which Thomas contended. There is undoubtedly a measure of truth in this attitude toward the two men.

Yet there is also a different point of view. Mr. Aitken was a pupil of Sir Robert Jones, and more or less associated with him for thirty years. Mr. McMurray worked with Sir Robert and has long occupied the quarters in Liverpool, at 11 Nelson Street, which were occupied by Thomas, even before Sir Robert's time. It would seem to me that the fine spirit of Sir Robert Jones, and the influence of his undoubtedly remarkable personality, have affected Mr. Aitken and Mr. McMurray, to an extent that blinds them somewhat to the peculiar quality of the teachings of Thomas.

To those of us who have been compelled to derive our knowledge of Thomas from his writings, and to a somewhat lesser extent have been influenced by Sir Robert Jones, it would seem that Sir Robert was never so consistent nor so emphatic as he might have been, in his enunciation or in his observation of those fundamental principles which dominated the life and practice of Hugh Owen Thomas. Sir Robert Jones undoubtedly inherited from Thomas what Sir Robert himself called "an orthopedic conscience." Yet in his writings and in his practice he relaxed considerably the technical details of the Thomas regime and even of the Thomas apparatus essential to the kind of rest Thomas demanded (and which is necessary) for the correct treatment of bone and joint disease. The very dogmatism which prejudiced Thomas' contemporaries against him, adds to the teaching value of his writings, which must be read and studied to realize how com-

pletely right he was in his attitude toward joint disease, and in his selection of apparatus and technic for treatment.

It was Dr. John Ridlon's appreciation of the value of rest, and appreciation of the fact that of the orthopedic surgeons of that generation, Thomas alone had the ability to understand and apply, that led Ridlon himself to be as positive as he was of the superior qualifications of Mr. Thomas in the diagnosis and treatment of fractures and joint disease. There is, unfortunately, an insufficient record by Dr. Ridlon still in print to indicate his own exceptional qualifications for his long championship of the teachings and methods of Thomas. In the absence of an adequate biography of Dr. Ridlon, it is a real tribute to him, however, to say that there has been scarcely anyone either in England or America, who has stressed so thoroughly and applied so intelligently all the teachings of Thomas with regard to rest in the treatment of fractures and joint disease. Those who prefer Sir Robert Jones as a teacher would seem to have fallen under the spell of his personality, and, at the same time, have failed to read such passages from Thomas, as for example, the following: "In the year 1863, Dr. H. G. Davis published a description of his instrument" (for the treatment of hip joint disease). "I became acquainted with it in the same year, but on *rational grounds* I was opposed to it, and did not venture to use it."

Or the following: "I will conclude by referring to the method of treatment by weight and pulley, which amounts to no more than confinement to bed. Dr. H. G. Davis, the author of a perineal system of treatment of hip joint disease, is credited with having suggested the use in hip affections of this useless, and

worse than useless, injurious method of treatment, when applied to hip disease, and in its application deceptive and irrational." "I assert that a fractured thigh, if treated by extension only, would be accompanied by vastly more muscular irritability, than if the same case was placed in a modern appliance with retention, in which the limb was retained and fixed immovably." "Efficient and enforced rest in joint disease as well as in fractures, is the infallible remedy for quieting the irritated muscles, not extension." [2]

Although Thomas began his professional life with a large practice, on his father's account as well as his own, his personal and professional conflicts must have disturbed him greatly. He began early to accumulate notes from his reading and case records; conclusions regarding methods were pressing upon his mind for expression long before they found utterance.

It was not until 1867 (at the age of 33) that he published his article on fracture of the jaw, which was recognized at once as a superior contribution to surgical literature. Then, as Frederick Watson says:

> Owing mainly to the persuasion of Rushton Parker, the first distinguished surgeon in Liverpool to become his ally, Thomas agreed to put his principles into print. He had every reason to anticipate success. Although not an experienced writer, his originality and clarity of mind made his surgical essays always illuminating. He was master of any subject that he wrote on, both historically and technically, and scrupulously precise in his statements. He never made a false claim for himself or denied credit to another when credit was due. He was a difficult man to meet in argument, and was no doubt detested in consequence by those whose errors and inconsistencies, pretensions,

[2] THOMAS, H. O.: *Diseases of the Hip, Knee, and Ankle Joints,* 1876, pages 5-11. (Referring to weight and pulley—elastic—traction)

and follies, he riddled and ridiculed. How then was it that so original a thinker, with a wider practical experience of his particular subject than any other orthopedic surgeon, failed within his lifetime to attract serious attention?

The first obstacle to recognition was quite elementary. "I think," wrote Robert Jones in 1913, "the present generation of surgeons in Liverpool have no idea of the amount of interesting and original material concerning which Thomas wrote. This is largely due to the peculiar and almost secretive way in which his works were printed and published. The printer, a quaint character whose name was Dobb, lived in a small shop in Gill Street. He was factotum and publisher, although, in the later editions of his works, the name of H. K. Lewis appears on the covers. Very few books were sold and the remainder occupied a large room in Mr. Thomas' home in Nelson Street. I do not remember if the books were ever advertised, but, whoever expressed himself as being interested, never failed to have a copy sent on to him.[8]

Because Mr. Thomas' father and other antecedents had been "irregulars" many criticisms were made of Thomas, who was often called a bone-setter or "only a splintmaker" by other surgeons in Liverpool or by "the faculty" in London. Thomas' own evaluation of bone setting as an irregular mode of practice applies so completely to all forms of limited, or sectarian practice, that it seems strange it has not been more widely recognized and more generally applied to chiropractic, osteopathy, Christian Science, and the like. To point out that the successes attained in the use of these irregular forms of practice are those naturally to be expected, either from the actual therapeutic means employed, or by the percentage of spontaneous cures which may reasonably be anticipated, under any circumstances, is clear enough to satisfy any fair-minded person. To

[8] WATSON, FREDERICK: *Life of Sir Robert Jones*, 1934, pages 71-72.

recognize also, as Thomas did, that among those who succeed as irregular practitioners, there may be those who have special abilities either in manipulative, psychiatric, or even in medicinal therapy not properly employed by their regular professional contemporaries, is only to say that anyone can recognize such instances if he is familiar with the care of the sick and injured under all kinds of conditions and circumstances. That these are incidental or accidental, however, and that, in the long run, such exceptional practitioners ("doctors" or healers) add nothing to regular practice, is the essential point to be recognized. That irregulars less adequately trained, with no knowledge of pathology or any information as to either surgery or mechanics, should make more mistakes than those with better training and experience should be too obvious to require comment or discussion. The fact that a man of Thomas' type could discuss these points so calmly and so reasonably should have a great influence upon all the rest of us in such debates.[4]

Mr. Thomas had a sublime confidence in his apparatus, and in himself. This is nowhere better illustrated than in his direct comparisons of "Thomas" methods and apparatus with those of his contemporaries and competitors. It was this dogmatism which prejudiced so many surgeons at home and abroad against him. The basis upon which Mr. Thomas reposed his confidence, however, was so substantial, that one hesitates, even at this time and distance, to criticise him too severely for his position. It is certainly a fact that as a result of Mr. Thomas' bone-setting, medical, educational, and clinical experience, he was in a position to

[4] THOMAS, H. O.: *Principles of the Treatment of Diseased Joints,* 1883, pages 63-64.

arrive at conclusions regarding these matters, which few of his associates or even his successors have enjoyed.

In order to appreciate Mr. Thomas' instructions and teachings, it is necessary to read his writings with care, especially the patient's records which he reported in such a satisfactory, even though narrative form. Of one thing we may be quite sure from the testimony of Dr. Ridlon and others: Mr. Thomas was entirely honest, both as to his case reports and his clinical methods. He may have had, in dealing with his patients, certain features of the bone-setter methods which he inherited, but his success in practice could not have been so complete nor so consistent without a consecration to his patients and a diligence in his efforts, which is seen but rarely and only in that type of devoted medical practitioner or surgeon which he represented.

It was my own good fortune to begin practice as a general practitioner. I covered the territory in and around Lincoln, Nebraska, on bicycle, horseback, and with horse and buggy, for about five years before the motorcycle and automobile came along. I did general practice, including obstetrics, general surgery, and pediatrics, until the time when Dr. Ridlon launched me in orthopedic surgery as a specialty beginning in 1904. It is partly for that reason that I am peculiarly appreciative of the attitude of Mr. Thomas regarding defects in the treatment of fractures, and the importance of discipline in the handling of patients and their families, and finally the application by all those who assume to treat such cases, of those fundamentals of rest upon which Thomas insisted in the treatment of bone and joint disease.

In this connection it is well to keep in mind Mr. Thomas' injunction to the effect that it is possible for

a surgeon to decide at once upon principle, and without trial upon the patient, whether or not a proposed line of treatment is acceptable. Dozens of modifications of the Thomas splint have been proposed in recent years. Many of them Thomas himself had tried and rejected. These we too should be able to rule out when they violate those fundamentals which Mr. Thomas laid down. Mr. Thomas' suggestion that beginners in practice, by selecting and employing sound methods of surgical treatment, may often outstrip their elders, conforms to the experience which many of us have had with nurses. Those who will do what they are told by their superiors in knowledge and experience are often more useful in the care of the patient than those of more mature years or longer experience, who have become fixed in certain habits, so that it is impossible for them to adjust themselves to, or "take orders" in, circumstances and conditions with which they happen to be unfamiliar. Sir Arthur Keith remarked that Thomas, as compared with research students like Hunter and Hilton, proved that a busy practitioner, by clinical methods, can become one of the permanent benefactors of medicine.

Modern orthopedic surgery has been influenced to a considerable degree by the splints and the fundamental teachings of Hugh Owen Thomas. But Thomas' influence has been much less than it should have been for these reasons:

1. Thomas' writings were not easily read or understood. They were never indexed, and they are long out of print—but they are classics or even masterpieces of orthopedic surgery.

2. Thomas' teachings, while they have provided us, in the words of Sir Robert Jones, with an "orthopedic

conscience," have been imperfectly preserved and transmitted to us even by his most loyal pupils—Dr. John Ridlon and Sir Robert Jones.

3. The fundamental factor of rest as a therapeutic agent has never been understood or applied by anyone (no exceptions) as well as by Hugh Owen Thomas and —contrary to many supposed authorities—no one else has been as judicious as to the employment of operative surgery, when necessary, or the resumption of function upon recovery, as Thomas.

H.W.O.

HUGH OWEN THOMAS

SIR ROBERT JONES

JOHN RIDLON, M. D.

Hugh Owen Thomas
1834-1891

BIOGRAPHIES

Hugh Owen Thomas

THE FOLLOWING introductory sketch of the life of Hugh Owen Thomas, is taken largely from the centenary lecture delivered by Mr. T. P. McMurray at the Liverpool Medical Institution, February 7, 1935.

Hugh Owen Thomas, the oldest of five sons, was born to Evan Thomas, a bone-setter, and his wife, when Mrs. Evan Thomas was on a visit to her parents at Bodedern Anglesea, August 23, 1834. Mrs. Thomas exercised a great influence upon her son. Together they discussed the essays and sermons of great speakers and preachers of the time, and every day he would read to her from the newspaper. Her influence remained with him all through life, and, after her death, he made a pilgrimage to her grave three times every year. Hugh Owen Thomas was a thin and nervous, somewhat delicate child; his health caused his parents considerable concern. He spent sometime with his grandparents at Rhos Colyn, where he lived and went to school until he was thirteen years old. His schoolmaster, Owen Roberts, gave much more than an elementary school education to his pupil, in whom he became very much

interested. They studied the poets, especially Cowper and Wordsworth, and quotations from them were often on the lips of Hugh Owen Thomas in his later years. He kept up a correspondence with his teacher, and when the master had fallen on hard times, Thomas assisted him freely and liberally.

During these school days, Thomas sustained an injury to his left eye. This left a scar which contracted his lower lid, and caused him some disability and discomfort which was never relieved. It was on this account that he wore the peculiar peaked cap which appeared in some of his pictures. He wore this so long and so continuously, that it became a habit of which he was so unconscious, that he wore it on unusual and unnecessary occasions.

From the age of thirteen to seventeen, Thomas continued his education at the college at Newbright, and from there he went to St. Asaph to become an apprentice to his maternal uncle, another Owen Roberts, a doctor at the Liverpool Workhouse Infirmary. Doctor Owen Roberts, like Hugh Owen Thomas' previous teacher, was a man of culture and broad education. Also, he was a pupil and friend of Sir Benjamin Brodie and Sir Morrell MacKenzie. At the age of twenty-one, Thomas entered the University of Edinburgh, and his lodgings were at the top of one of the tall houses in that city. Thomas' life as a student was limited, as to luxuries and even comforts, to an allowance of only ten shillings a week. His career as a student was undistinguished, but he was secretary of the University Temperance Society at a time when the great Guthrie was pastor at the church where he was a regular attendant. One of the impressions he carried away from Edinburgh was that many amputations done

there were upon patients whose limbs might have been saved. His attempts at conservation of diseased extremities in later years were often the result of this feeling. His two years at University College in London may have been unsatisfactory in some respect, as he rarely referred to this period in later conversation. In any case, the third year which he had expected to spend in London was abandoned, and he returned to assist his father, who had become ill, in his practice in Liverpool. Later, after his father's recovery, he returned to University College, where he passed the examination for membership of the Royal College of Surgeons, after which he spent a year of study in Paris.

A professional association between father and son was obviously impossible from the beginning, so they soon went their separate ways. But Thomas always referred to the elder Thomas (even as a practitioner) with respect.

Thomas' consecration to his patients, as patients, from the beginnings in Hardy Street through his years of large practice at 11 Nelson Street, accounted in large part for the legendary energy and industry for which he is better known.

Except for Thomas' regard for his principles and his patients it may be doubted whether his frail physique would have endured the hard life he led as well as it did. His devotion to Mrs. Thomas and her loving care of him must also have been factors of major importance in his years of strenuous effort.

Sir Robert Jones
1857-1933

Sir Robert Jones

FROM THE AMERICAN point of view, Sir Robert Jones was a shining example of the village boy who goes to the city for his training and his career, and makes good. Robert Jones, the son of Hugh Owen Thomas' sister, was prepared from boyhood by his mother and his uncle for a career in the medical profession. Robert Jones seems never to have had a doubt about the destiny that was prepared for him. He applied himself equally to his training, to his early professional efforts, and to his later tremendous opportunities, and made a success not only for himself, but added to the celebrity of his preceptor and teacher, Hugh Owen Thomas.

Robert Jones qualified for membership in the Royal College of Surgeons at the age of twenty, and began practice with Hugh Owen Thomas at once. The very large practice which Thomas had, and which Robert Jones greatly increased, was a tribute not only to the professional qualities of both men, and to the special methods which they initiated and developed, but to the enormous industry which was always characteristic of Number 11 Nelson Street, where they worked for forty-seven years. This program of work is referred to so many times by Thomas, and by the biographers of

Thomas and Robert Jones, that no special description is necessary. It should never be forgotten, however, in considering the great success in their work, that long hours of industry, were a factor of the greatest importance. Both Thomas and Jones, were instinctively devoted to the professional care of their patients. They both had human qualities of a very exceptional kind. That they also had a flair for publicity which we have seen since in such examples as John B. Murphy, and the Mayos and in Robert Jones' professional neighbors, Sir Harold Stiles and Lord Moynihan, has also a suggestive value.

The professional literary club which Robert Jones developed early in his career, and to which Thomas was an enthusiastic contributor, as well as a professional group formed later with Stiles and Moynihan, indicates the value that Robert Jones placed upon association with good company. This he appreciated, both for his professional development, and for his personal satisfaction. Both earlier and later, Robert Jones encouraged good work on the part of others. That he was not so critical of the deficiencies and mistakes of his contemporaries as Hugh Owen Thomas, was not only notable in itself, but impressive by comparison of the careers of the two men.

Too much credit, I think, has been given to Sir Robert Jones for his contribution both to the Liverpool practice and the Hugh Owen Thomas reputation. The success that Thomas achieved during his lifetime, and that has developed to a greater extent since then, must be attributed to Thomas' exceptional comprehension of the rôle of fundamentals in science and surgery, and to the innovations he introduced for applying his methods and his apparatus to securing rest for his in-

jured and diseased patients. Recognition of Thomas was indeed slow. To his appreciation both Jones and Ridlon made very substantial contributions. The eventual acknowledgment of Thomas, however, is definitely upon the basis of the everlasting tendency for the right in surgery as elsewhere to triumph over that which is wrong.

Sir Robert Jones' exceptional qualities as to personality, friendship, and social as well as professional success, were, of course, outstanding throughout his entire career. That his charm of disposition, and his extraordinary good nature were sometimes responsible for concessions, both professionally and personally, which Thomas would not have made, has detracted only in minor ways from the more thorough and consistent adoption of the Thomas fundamentals in our practice of the present time. One might feel that Jones, like Lister, could have avoided some of the tendencies there have been toward less rigid observance of the rules that Thomas insisted upon throughout his career. On the other hand, there is a definite merit in the suggestions that Jones, by his popularization of the Thomas apparatus, has led us gradually to a point where the fundamentals of surgical practice, as enunciated and applied by Thomas, both at present and in the future will be more widely recognized than they would have been without Sir Robert Jones' very great contribution to the situation.

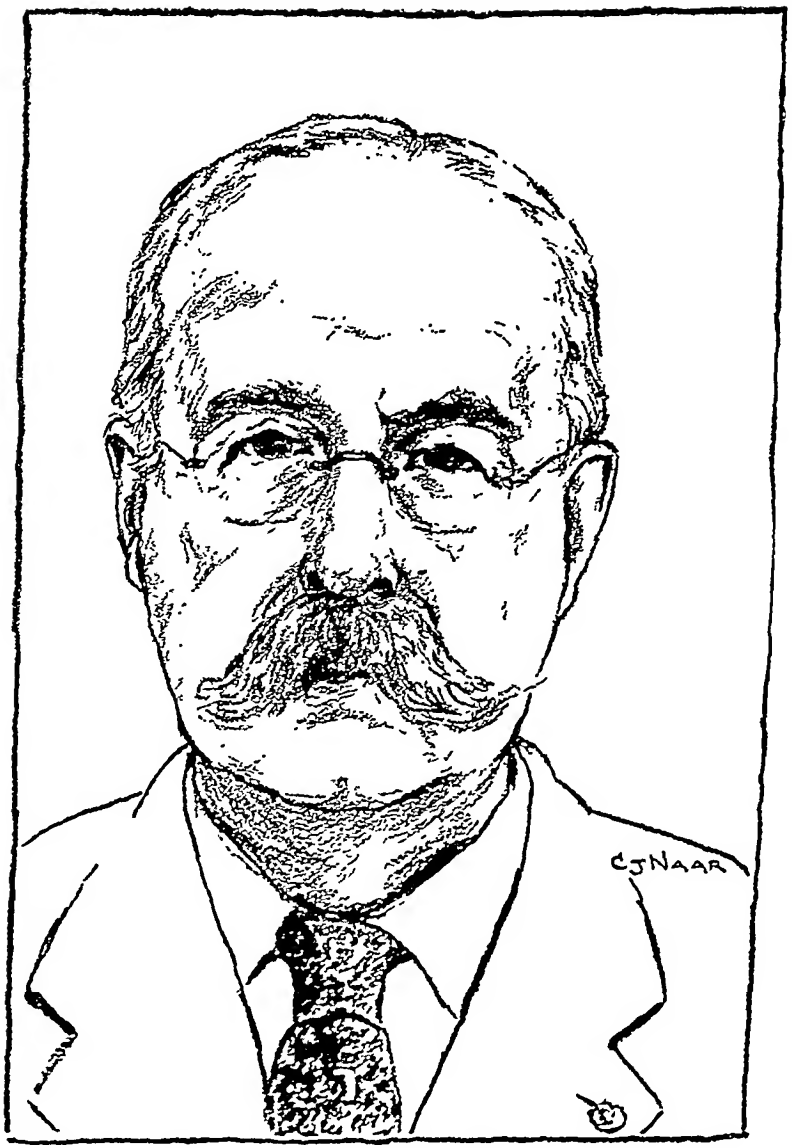
Robert Jones' early triumph in dealing both with his patients and with the medical profession in Liverpool and Great Britain, indicates how much more acceptable he was than Thomas had been. Robert Jones obtained early, hospital appointments, teaching opportunities, and offices in local and national as well as international

societies, to which Thomas, if he aspired to them at all, would have hoped for in vain. Later on, and after the conspicuous contributions of Sir Robert Jones to the surgery of World War I, recognition by universities, colleges, medical societies, both at home and abroad, came to Sir Robert Jones easily and naturally at the slightest suggestion of his colleagues and contemporaries, who were so appreciative of his many contributions, both to surgery and to surgical teaching.

Institutions like his hospital at Baschurch, presided over by his loyal associate, Dame Agnes Hunt, his orthopedic centers developed during World War I, and his various other centers of orthopedic surgical activity in Liverpool and London were all personal as well as professional tributes to Sir Robert Jones. In these and other ways he made tremendous contributions to his own professional success and to the orthopedic specialty. Also, he added his own methods and technics and substantial contributions to those already made by Thomas. His enormous industry, as evidenced by the large number of operations done by him throughout his career, as well as his extraordinary skill and technical ability, were recognized by surgeons from all over the world, who visited him at Liverpool, and who invited him to their hospitals and to operate in their clinics.

A final tribute to his very great personal and professional success in his home city is that his ashes rest in an urn on a column near the foundation pillar of the great Liverpool Cathedral. In fact the ashes of Sir Robert Jones were the first to be honored in this way by this great Cathedral. As far as the surgical profession is concerned, that he is permanently enthroned in our memories and in our surgical records on a high pedestal, has been indicated in so many ways,

in so many teaching universities and societies, that we shall always remember him with gratitude, with reverence, and with the greatest possible personal affection.



John Ridlon
1852-1936

John Ridlon

JOHN RIDLON was born in the township of Clarendon, Rutland County, Vermont, on November 24, 1852. He was one of three boys, but the two others died in infancy. His father, Noel Potter Ridlon, was a farmer who became a dairyman just before the Civil War. His mother was Nancy Bromley Hulett Ridlon of Pawlet, one of thirteen children. Dr. Ridlon always spoke highly of his Grandmother Ridlon whose husband died at the early age of fifty-five, and who with forty acres of land and about eight hundred dollars in money at interest, raised eight children and five grandchildren.

In 1875, Ridlon entered the College of Physicians and Surgeons in New York with Professor E. G. Seguin as his preceptor. When he graduated, March 1, 1878, he was Class Marshal. He obtained a staff position at St. Luke's Hospital in New York, serving as house officer for two years. On June 4, 1879, he married Emily Caroline Robinson of Newport, Rhode Island. Mrs. Ridlon's father was a sea captain of many years' service. From him they inherited the home at No. 1 Sea View Avenue in Newport where were spent the last years of Dr. Ridlon's life.[1]

[1] H.W.O. (Extracts from) *Surgery, Gynecology and Obstetrics*, July, 1936, Vol. 63, 120-123.

Dr. Ridlon left St. Luke's Hospital in 1880 at the time their first child was born. For the next two years he was in general practice at 152nd Street and St. Nicholas Avenue. In 1880 he received his first orthopedic appointment as assistant to Dr. Newton M. Shaffer at St. Luke's Hospital, later going to the New York Orthopedic Hospital and Dispensary.

Dr. Ridlon was one of the first in America to be attracted to the work of Hugh Owen Thomas in Liverpool. He went to see Thomas work at first hand, and became one of his very few close friends and a lifelong friend and associate of Thomas' nephew and successor, Sir Robert Jones. When Dr. Ridlon visited Mr. Thomas first, he expressed skepticism as to the results claimed for the Thomas traction splints in hip, knee, and ankle disease. Mr. Thomas was able to convince him of their utility and efficiency, however, and Dr. Ridlon became and remained the leading American exponent of Thomas' principles of treatment for diseases and injuries of the extremities. Thomas' splints and the principles he taught received world-wide recognition during World War I and led to the saving of thousands of lives and limbs.

When Dr. Ridlon returned from Liverpool in 1887 he made and applied at St. Luke's Hospital the first Thomas hip splint ever to be used in this country for tuberculous hip disease. Dr. Shaffer ordered the splint removed but Dr. Ridlon refused to remove it on the ground that he was responsible for the welfare of the patient. At the end of his year's service Dr. Shaffer prevented his reappointment and Dr. Ridlon went with Dr. McBurney to the Vanderbilt Clinic. A little later, when Dr. Gibney was elected to a professorship which Dr. Ridlon had expected, he moved, in 1889, to Chi-

cago. Concerning the New York controversy over the use of the Thomas splint, it is interesting to read in Dr. Judson's book (1905): "flexion and abduction (in hip disease) are rapidly reduced . . . by the use of Mr. Thomas' hip splint in the skillful hands of Dr. Ridlon."

In June, 1890, Dr. Ridlon returned to Europe to assist in the organization of an Orthopedic Section of the International Medical Congress. He called upon Grattan (of the osteoclast) at Cork, Thomas and Jones at Liverpool, George Arthur Wright at Manchester, Florian Beely of Berlin, and many others. Dr. Ridlon and T. L. Stedman of New York had been commissioned by the *New York Medical Record* to report the Congress. Dr. Ridlon gathered the news while Dr. Stedman, from his room at the Kaiserhof Hotel, cabled fifteen thousand words to New York, thus "scooping" all other American medical journals by two weeks!

When Dr. Ridlon came to Chicago in 1889 he was made Instructor in Orthopedic Surgery at Northwestern University by Dr. N. S. Davis. A year later he was made Professor and served for sixteen years. Subsequently, he was Professor at Rush for three years, Professor and Secretary of the faculty at the Woman's Medical College for three years, Orthopedic Surgeon at St. Luke's Hospital for ten years, and Attending Orthopedic Surgeon for a time at Michael Reese Hospital. He organized the orthopedic service of the Evanston Hospital and the Home for Destitute Crippled Children. He was Chief Surgeon at the latter institution for twenty years, leaving there with regret and a tinge of bitterness at being displaced by younger men. At the time of his retirement, however, he was made consultant and life member of the corporation.

Doctor Ridlon was a loyal member of what might

have been called the "Western Bloc" in the American Orthopedic Association, in its early days. This group included such men as Gillette of St. Paul, Moore of Minneapolis, Steele of St. Louis, Griffith of Kansas City, Packard of Denver, and Sherman, and Watkins of San Francisco. Several of these men were rugged individualists of the pioneer type, especially Griffith who had been a Colonel in the Civil War, and continued his activities all through the early years of the American Association of Military Surgeons.

When I went to the American Orthopedic Association Meeting in California, in 1928, Doctor Ridlon gave me a special message to the widow of Doctor Harry Sherman, who was still living there. In the course of my shopping for old books on the history of surgery and orthopedic surgery, I found quite a number of Doctor Sherman's books in the celebrated Holmes Bookshop, in Oakland, California. When I called Mrs. Sherman, I mentioned to her that I had found some of these books, just to tell her that they would find a permanent home in my collection at the American College of Surgeons in Chicago. To my astonishment, she was very much grieved; she had understood that all of Doctor Sherman's books were in a special library in one of the San Francisco hospitals. They were to have been preserved there as a collection and as a memorial to him. I offered to return them for that purpose, but she would not permit me to do so.

In Doctor Ridlon's last years, he distributed his library himself, giving special books, and special groups of books to Steindler, Eikenbary, Berkheiser, and others, including many to me. Quite a number of these with Doctor Ridlon's autograph, and with comments upon the authors in Doctor Ridlon's writing, will be

found in the American College of Surgeons Library.

Dr. Ridlon was a charter member of the American Orthopedic Association (1887). At its tenth meeting, he was elected President. In his presidential address, he called attention to the presence of fifty-two members from sixteen cities and spoke of the value to the Association of having not only those from the larger centers with abundant opportunities "to see," but of having also those from the smaller towns who had time "to think." It is significant that among those from the "smaller towns" at that meeting were Gillette of St. Paul, Griffith of Kansas City, Moore of Minneapolis, Packard from Denver, Sherman from San Francisco, Steele from St. Louis, and Weigel from Rochester, all of whom have placed their names permanently upon the roll of honor in orthopedic surgery.

That Dr. Ridlon dominated the affairs of the American Orthopedic Association for many years was not only charged by others but admitted by himself. Indeed he said: "When I returned from the International Medical Congress (in 1890), I rushed back to New York to be in time for the meeting . . . in Philadelphia. DeForest Willard was President and George F. Ryan was Secretary. I proceeded to elect A. B. Judson as President and myself as Secretary. At that time the Secretary was also Treasurer and Editor of the *Transactions*. I served as Secretary for sixteen years and one year as President. I was counted as 'Boss' of the Association because I elected every officer except Weigel during that time."

Dr. Ridlon later completed the unexpired "war terms" as Secretary for Ralph Fitch of Buffalo in 1915, and for the writer in 1917-1918.

Characteristic of Dr. Ridlon and his direct method

of dealing with any problem was his preparation for the meeting of the American Orthopedic Association of 1895. As was the custom, the meeting was to be held in the home city of the president—who in this case was Dr. Ridlon and the meeting was, therefore, to be held in Chicago.

By way of preparation for the meeting Dr. Ridlon organized a Chicago Orthopedic Society [1] with Hoadley, Blanchard, Hosmer, Coolidge, Woley and Ridlon as members, and they each paid a $5.00 "fee" at each monthly meeting to provide a fund for the larger meeting in September, 1895.

One of Dr. Ridlon's outstanding characteristics was his generosity both professionally and financially to younger men. There was never a time when he would not give his energy or his money to assist one who was disposed to devote himself to the study and practice of orthopedic surgery. At an informal gathering in Seattle, on September 24, 1946, Doctor John Lecoq referred to the extent to which Doctor "Eik" Eikenbary had patterned many of his professional, as well as some of his personal habits and customs, upon those of Doctor Ridlon. Eikenbary had been one of Doctor Ridlon's favorite pupils and had much of Doctor Ridlon's devotion to his patients, but also some of his brusque directness, both in his dealings with his clientele and with his professional contemporaries, especially those whose methods and conduct he did not entirely approve. Eikenbary was one of the original members of the "Goldthwait Unit," the twenty of us who went with Colonel Goldthwait on the *St. Paul,* from New

[1] The Society was reorganized in 1901 and we have the minutes for 1901-1905 in the collection at the American College of Surgeons Library.

York in May of 1917. He served his two years on duty with the British, and later with the American Expeditionary Force as the rest of us did. He died suddenly, and rather unexpectedly, at the height of his professional success, in Seattle, and after having founded the orthopedic clinic with which the two doctors Lecoq and the Doctors Leavitt are now associated. Many of the other men of rising prominence in the middlewest and even the far west have been Dr. Ridlon's students in orthopedic surgery, a number having been undergraduates during his professorship at Northwestern University.

In 1923 it was the privilege and pleasure of this group of students and a few other friends of Dr. Ridlon to gather in Chicago, and to present to him and Mrs. Ridlon the fine portrait painted by Mr. Carl Bohnen which hangs in the Archibald Church Library of Northwestern University Medical School.

In succeeding chapters are many references to Dr. Ridlon's life in Chicago and his later, less happy years in Newport. To his career as surgeon, colleague of Thomas and Jones, and teacher, Chapter VIII and the supplement by Arthur Steindler are largely devoted.

Fig. II. Hugh Owen Thomas and his nephew Robert Jones. (From McMurray, T. P.: *The Life of H. O. Thomas,* Saml. Hill & Sons., Liverpool, 1935.)

CHAPTER I

A Review of Past and Present Methods in Surgical Practice

SEVERAL OF Thomas' more important books begin with "Past and Present Methods in Surgical Treatment." These introductory chapters indicate wide reading and careful study of the methods of his predecessors, and especially of his contemporaries. Thomas, himself, was an innovator. He had certain methods and certain apparatus for applying the fundamental principle of rest, especially in diseases of the bones and joints, which he was anxious to display in comparison with previous and contemporary surgical practice. That he did this so successfully has not been generally recognized. Both in Liverpool and London, Thomas was looked upon during his entire lifetime, more or less as a descendant of quack bone-setters, less than fully qualified for surgical practice, and at best perhaps only a skillful bracemaker.

It is astonishing that this myth has persisted to the present time. Even Thomas' friends who have transmitted his teachings to us, have perpetuated this impression to such an extent as to leave a cloud about his

early education, his literary qualifications, and even his surgical practice. The fact that Thomas actually, as a boy, was better educated, more broadly developed culturally, and better prepared to be a teacher, even apart from surgery, than most of his professional associates, is often not understood. Dr. Owen Roberts, the uncle of H. O. Thomas, had obviously designed that he should take his sister's son as an apprentice in medicine. Under Dr. Roberts, Hugh Owen Thomas fortunately continued in the course of broad literary, sociological, and scientific training so well begun by his earlier tutor, the other Owen Roberts, schoolmaster at Gatehouse.

The fact that Thomas became a somewhat selfish individualist, that he did not attend medical meetings, that he wrote, published, and circulated his own books in rather limited editions, and that finally his writings were never properly indexed, must account to some extent for the fact that he has had but few competent interpreters and biographers. An illustration of the casual manner in which some writers dispose of Thomas is the following:

> In comparing the different types of ischial seat constructions, we have first to mention the Thomas ring, originally devised by Hugh Owen Thomas, for the unweighting of a tuberculous knee-joint. The Thomas ring has considerable disadvantages which cannot be completely eliminated even if the shape of the ring is modified to a triangular shape corresponding to the anatomically correct form of the body. The Thomas ring is bulky and inconveniences the patient at the perineum to such an extent that it is hardly possible to use it should an unweighting [1] brace be required for both legs.[2]

[1] An erroneous conception; the splint was designed to immobilize the knee!

[2] JORDAN, H. H.: *Orthopedic Appliances,* 1939, pages 220-221.

Any careful study of Thomas' writings will give us the same (or even better) impressions of Thomas as those obtained from Aitken, McMurray, Sir Arthur Keith, and others who have taken pains to read what Thomas so carefully prepared and laid before us. They reveal Thomas as a general practitioner with an enormous practice, a surgeon of excellent judgment, an orthopedist, a sound pathologist, and an extraordinary mechanician. For the different attitude and perception of a sound surgeon who thinks about these matters in terms of principles, see the article by Sumner Koch.[3] Dr. Koch says:

> Thomas' claim to enduring fame is securely based on his logical and successful methods of treatment of disease. At the very basis of his treatment was the principle of maintaining complete rest of injured and inflamed tissues.

It has long been one of my points in teaching (since the years spent in laboratories of histology and pathology) to emphasize that every physician should think first of his injured or sick patient *as a patient,* then of the tissues involved, and finally of the therapeutic agents or methods to be employed.

Thomas and John Hilton began writing at about the same time. Thomas was quick to acknowledge his indebtedness to Hilton for the accuracy and enthusiasm of the famous "Apostle of Rest," but was also critical of those, including Hilton, who failed to carry out in practice a consistent program of rest for their patients. Hilton, himself, as far as I know, never acknowledged the contributions Thomas made in the way of methods

[3] KOCH, SUMNER L., and MASON, MICHAEL L.: Purposeful splinting following injuries to the hand. With an introductory tribute to the work of H. O. Thomas. *Surgery, Gynecology and Obstetrics,* 68:1, 1939.

and technics suitable for obtaining "rest." But Thomas in his own time needed no champion. Against the historical backgrounds which he prepared, and beside the errors of practice of his contemporaries, Thomas was able to display to great advantage his own methods, his own technics, and especially his own apparatus. He was abundantly able in hundreds of cases, to show results far better than those which had been obtained before his time, or those which were being reported in the current medical periodicals of his day. All of this material, very convincing and very final as to the prevailing debate, may be found in his writings which, even if faulty in the respects suggested, are still adequate for all who will take the pains to read and study the arguments and testimony which they present. In the preface to his reprinted chapter (1878) from *Diseases of the Joints,* there are several of the typical Thomas comments which, while "tossed off" rather casually, have much deeper roots than might appear. He said:

> The furore excited some years ago by the reported success of the American method has passed away and in this country it has been discarded. (I wish we might even now say the same for weight and pulley traction.) So will the treatment of cretinism by circumcision (have its short day and) become a surgical curiosity. "Happy thoughts" seldom succeed in surgery. It is not possible for me to be tolerant of methods that must be wrong if mine are right. The principles of treatment should not be left to the discretion of the surgeon but should be unalterable.[4]

In the present work we have taken the position that if one really reads Thomas he needs no interpreters or apologists. His methods and apparatus, tested even by the practice of the *present* day, will convince anyone

[4] From: *A Series of Clinical Lectures,* Edited by E. C. Seguin, Vol. III, No. xi, 1878, page 298.

of their superiority. Refinements and improvements should be only such as supplement Thomas' teachings and do not conflict with the fundamental principles which he enunciates. In fact, it would be far better for our surgical practice if most of the "modifications" and "improvements" of Thomas' apparatus, had never been brought to the light of day.

One of my own comments in regard to that is as follows:

In acute infections even more than in chronic bone and joint disease, immobilization and rest are necessary to avoid or reduce inflammation, scarring, subsequent fixation, adhesions, and ankylosis.

We do not seem to have arrived at this "rest" point of view for the acutely inflamed fractures and compound fracture wounds. There is still the attempt to diminish the amount of apparatus, to provide more joints and mobility, to make our patients ambulatory, and to render less efficient rather than more so the kind of control which Thomas described long ago as rest "enforced, uninterrupted, and prolonged."

We should not forget that scarring, stiffness, and disability in the vicinity of fractures are brought about by improper motion, inflammation, and irritation just as they are in tuberculous joint disease.

When I began my infrequent-dressing and rest method for osteomyelitis, infected wounds, and compound fractures about twenty years ago, I had become convinced that the Carrel-Dakin, Willems, and Blake teachings, and primary and secondary suture were all doing much harm. My feeling arose partly out of a realization that the teaching of Lister, Hilton, Hugh Owen Thomas, and Ridlon regarding infection and rest were being violated. I believed firmly *that wound surfaces should be protected, that infected wounds of any degree should be drained, that all fractures should be reduced and immobilized, and that any injured or inflamed limbs should be protected against muscle spasm and other painful movements.*

A very few clinical trials were sufficient to convince me of the correctness of these assumptions. Many years of further

clinical experience have assured me that these fundamentals are correct, but that other details of treatment are often incidental, unimportant, and unnecessary.

My own results (for twenty-five years now—1921-1946) have been obtained without sutures, without drainage tubes, and without antiseptic wound dressings. Sometimes cures or results attributed by others to chemical agents or "modified" techniques have been credited wrongly to them, when better immobilization, rest, and protective methods have given the patient his own chance to recover.[5]

Whatever the psychiatrist might say about the actuating motives that guided Hugh Owen Thomas, it is a fact that practically all of his work was done in an atmosphere of controversy. He had a way of promulgating his teachings and even of treating his patients that aroused opposition, not only among his competitors and critics, but even among his friends. There is an indication of this in his *Note to the Reader.* He says:

Since my first contribution to the literature of the subject matter of this volume (*Intestinal Obstructions*), seven years have elapsed, and as the two previous editions have been exhausted, this, combined with my having noticed that my teaching has already influenced practice in the treatment of intestinal lesions, induced me to rewrite and remodel the present edition in the hope that I might succeed in further demonstrating the need of reform and of perceiving still greater amelioration in treatment, so that I shall not continue an isolated advocate even though, as hitherto, my efforts may be ignored by writers who have adopted my teachings, these have been my incentives to return to the arena.[6]

[5] ORR, H. WINNETT: *Determining Factors in the End-results Following War Wounds and Compound Fractures.* Read January 8, 1942, at the annual meeting of The New York Academy of Medicine. Reprinted by permission from the Bulletin of the Academy.

[6] THOMAS, H. O.: *Intestinal Disease and Obstruction,* 1883, page 1.

The volume on *Intestinal Obstructions* is much more than a plea for the employment of rest in intra-abdominal conditions. Thomas succeeds in outlining a program of treatment which should have its fundamental teaching value to every surgeon in every department of the surgical specialty. At the time when, as Thomas says, he "re-entered the arena" of discussion on this condition, he said: "There is none, of which the treatment so urgently needs reformation as this painful and dangerous class of maladies."

Then to indicate the seriousness of the combat in which he is about to engage, he begins the attack with the following:

> Judging from public clinical records, those gentlemen who have had superior opportunities as teachers or representative men, seem to be farthest astray. It may be that the timidity of the less favored class amongst us has, to some extent, had a wholesome influence upon practice.

That Thomas was a close student of the historical literature, is evident by the character of his introduction to this discussion. He called upon the writings of Hippocrates to illustrate the point that ileus was among those diseases for which Hippocrates predicted death usually by the seventh day. Thomas begins his condemnation of the usual historic as well as the current practice, by saying:

> Hipprocates' treatment consisted chiefly of inflating the intestines and giving enemata. This mode seems to have been followed by Celsus, by Paulus Aegineta, and also by Aretaeus, the latter of whom graphically gives us his prognosis, which probably was also that of his medical contemporaries.
>
> "In ileus it is pain that kills with inflammation of the bowels or straining and swelling, a most acute and most disgusting form of death. For others, when in a hopeless state of illness, fear nothing except their impending death; but those in ileus,

from excess of pain earnestly desire death. The physician, therefore, must neither be inferior to the infection, nor more dilatory; but, if he finds inflammation to be the cause, open a vein at the elbow by a large orifice, so that blood which is the pablum of the inflammation may flow copiously, and it may be carried the length of the deliquium animi, for this is either the commencement of an escape from pain or of a torpor ending in insensibility. For in ileus a breathing time though for a short space, even loss of sensibility, will prove an interval from pain; since, also, to persons enduring these pains, to die is happiness, but to impart it is not permitted to the respectable physician; but at times it is permitted when he foresees that present symptoms cannot be escaped from, to lull the patients to sleep with narcotics and anesthesia."

Thomas continues:

Sydenham's method was a great improvement upon the practice of his predecessors. He reformed the dietetic treatment, a matter of fundamental importance; he also detected the value of sedatives; but I do not find that, up to our day, the reforms which he taught have widely influenced practice. He had not wholly given up purgatives—this may be noticed in the paragraph entitled Iliac Colic—nor had he cleared his prescriptions from the absurdities of his contemporaries.[7]

From historical methods to those of his contemporaries which he hoped to reform, Thomas selected case reports from the literature of the period for comment.

In the *Medical Times and Gazette,* 1872, vol. 1, pp. 3; 64, four cases of intestinal lesion are reported. The treatment was as follows:

In the first case the treatment followed was giving brandy by the mouth, and passing up by the bowel, per rectum, a long flexible tube, which was soon followed by syncope and death. In the second case castor oil was prescribed, calomel, purgatives, warm enemata, brandy, and opium. The patient died after extreme suffering. In the third case the treatment began with

[7] Ibid., pages 3-5. (This is Dr. Ridlon's copy.) See also: Adams. Hippocrates.

opium, and solid food was almost omitted. The patient was soon relieved and recovered with very little pain. In the fourth case slight restriction of diet was ordered. The medical interference consisted in enemata of turpentine, with belladonna, nux vomica, and opium, by mouth. The patient died on the fifth day. The treatment followed in the fifth case was: poultices, opium, warm bath, enemata, strychnia, and nitric acid, with restricted diet; on the fifth day recovered.

The reporter of these cases appends some of the most irrational comments that were ever committed to paper. Regarding the remedies employed, he wishes the reader to understand that the action of belladonna is not fully ascertained, it appears in small doses to allay pain (like opium) and in large, to increase the energy of the intestinal motor nerves.[8]

Another case report that drew from Thomas even more vigorous criticism was the following:

> This case recalls the treatment practiced upon Madame Dudevant (George Sand), as given in the *British Medical Journal*. In her case there was injected into the bowel a liquid, *while in a state of effervescence.* To this most painful, irrational, and useless procedure, the elite of the profession in France were consenting parties. The routine of treatment throughout differed in nothing from that which was acquiesced in—as we have seen, by the members of the Metropolitan Medical Societies. Madame Dudevant would have had a far better chance of recovery had no medical aid been sought for her.

One may feel perhaps that modern "discussion" in our societies or journals might be more effective, and inspire more thought, if vigorous comment like the above were permitted.

The views which Mr. Thomas advocated later, regarding the use of an immobilizing apparatus rather than traction, are obvious deductions from the above. That is, he was opposed to any method of treatment which caused irritation, or which brought about nerve

[8] Ibid., page 10.

or muscular response to irritation, or which, as he thought, caused the patient to have more pain and discomfort and aggravated the disease. While it seemed to many of Mr. Thomas' contemporaries that he was dogmatic and critical as to their methods, one can see the basis upon which he rested his argument in favor of immobilization and rest. He, himself, with his bone-setter ancestors, had gone through the movement, traction, and manipulation methods which caused muscle spasm and pain, and he had demonstrated to his entire satisfaction the greater efficiency and greater comfort of immobilization as a method of treatment. It was this spirit, however, which evoked the kind of comments made by Dr. Steele of St. Louis at a meeting of the American Orthopedic Association.

Mr. Thomas has left us a number of published volumes; no one of them, however, is a masterly treatise. They are chiefly therapeutic suggestions. His style is not easy, and repetitions are frequent. At times markedly controversial, complaint has justly been made of the intemperate tone which defaces too many of his pages. Americans, especially, in their orthopedic work are severely berated.

Mechanical therapeutics was his forte. Individually I am enough of a tinker to appreciate a surgeon like Mr. Thomas, who understood the principles of mechanics, and was so adroit in the use of machinist's tools that he could fashion a metal splint to the requirements of a fractured bone, a deformed limb, a crooked back, or a diseased joint.[9]

Mr. Thomas' qualifications as a clinician, as well as his disposition to provide for every contingency in preoperative care, is indicated by the following:

The classification of symptoms below is of etiological, rather than of practical value, as all forms of obstruction, sooner or later, develop signs akin in detail.

[9] STEELE, A. J.: *The Orthopedic Work of the Late Mr. H. O. Thomas. Tr. Am. Orth. A.*, Sept., 1891.

Analysis of General Symptoms.

Favorable Course	Unfavorable Course
Unusual weight and distention of the abdomen, with or without pain.	Unusual weight and distention of the abdomen with pain.
Thirst.	Thirst.
Pain.	Pain.
Dry and furred tongue (varied).	Profuse perspiration.
Accelerated pulse controllable by medicine.	Furred dry tongue (seldom varied), acceleration of pulse, not controllable by medicine.
Rise or fall of temperature in response to remedy.	Early rise of temperature with fall at a later stage, the temperature slightly improved by medicine.
Vomiting, not oftener than four times in twenty-four hours.	Frequent vomiting.
Scanty urine.	Scanty urine.
Tympanitic abdomen.	Tympanitic abdomen.
Constipation.	Constipation sometimes relieved.
Collapse and reaction.	Collapse and death.
Passage of gas per rectum.	
Discharge of intestinal contents per rectum.	
Slight recurrence of constipation.	
Convalescence.	

Even this conscientious attention to detail in diagnosis, however, was in some degree an inheritance from his father. That Evan Thomas had better instincts as to the care of his patients as patients than was expected of a bone setter, is indicated by an incident in 1860 when he returned a patient with his fee, to Dr. Redhead, a regular practitioner, with the comment that "matter was formed at the joint." There is evidence of the same kind of "science of the bedside" in the following:

> The diagnosis of intestinal obstruction can be effected easily, yet there are to be met with lesions not connected either with the intestine or its covering, which induce symptoms simulating it, such as the traversing of a calculus along the ureter, or a gall stone along the bile duct, or the rupture of abscesses, malignant tumors, and of aneurismal sacs into, or in the neighborhood of, the peritoneum; but should any of these lesions lead to error of diagnosis, it is satisfactory to know that the treatment is the same in all.

That Thomas was consistent in his thinking about rest, and had been influenced by his experience in various departments of practice, is nowhere better exemplified than in the following:

It has fallen to my lot that the major part of my practice has been surgical, and a large portion of it has consisted in attendance upon patients suffering from fractures. When these were compound, acting from the influence of my early training—the common practice with surgeons—as soon as the primary "setting," etc. were performed, the next object to be attended to was immobility of the limb, and that this should not be interrupted but as seldom as possible by not disturbing the patient. As soon as instructions with this end in view were given, the sufferer and his friends would inquire, "How are we to manage the bowels?" Then I would advise a purgative on the second or third day, to be repeated at intervals, under the supposition that this was a very necessary item of treatment to prevent ulterior evils. Such was my method for many years, and is now the method followed by many surgeons. To this plan there are several objections: First, the fracture is much shaken by the use of the bed-pan; secondly, the patient is disturbed at a period when he is excited and has much pain, and as he cannot do much to assist the nurse, he is often roughly handled. Now these evils are much diminished or are totally absent in the third or fourth week; consequently, if the bowels were allowed to remain in a state of quiescence until this period, there would be the advantage of less pain, the fracture being slightly consolidated; and the patient having calmed down has confidence in his ability to assist his nurse. These advantages are palpable aids to a cure, and I determined to secure them by following the method that made prolonged constipation harmless during the existence of acute obstruction. From this practice I now never deviate, as it has been an invariable success from the first, now about ten years ago. The occasions on which I have prescribed this plan must be very numerous, and fractures are accidents the surgeon meets so frequently with that the correctness of my method can be soon and frequently tested. My practice now is the following, in order to secure the utmost rest in severe fractures of the ribs, neck and shaft of femur, knee-joint or leg, viz.:

As soon as I have arranged the injured limb, instruction is given to the patient and those in charge of him to restrict his food to a breakfast of tea, biscuit, and butter. Midday meal: same as that advised for breakfast. Supper: arrowroot and water, with either wine or brandy added to flavor it, milk being especially prohibited, as the prolongation of the constipation to a spontaneous termination cannot be tolerated by some persons if milk is consumed. I also inform the patient that I desire that the bowels should remain undisturbed one month if possible; but in these cases I have never been able to prolong the constipation beyond the third week, even when an evening opiate has been taken to ease the pain of the injured limb.[10]

If we should now be guided by the same fundamentals in our hip fractures, spine fusion operations, and the like, and make use of our better knowledge about the venous administration of various fluids, we should contribute largely to the comfort and safety of many patients who get but little rest or comfort.

This is an expedient in the after-care of patients following spine and extremity operations, to which I have resorted on numerous occasions. I have seldom been as strict regarding the preoperative care of the patient, the control of the diet afterward, or the conduct of the case with regard to nursing, as I should have been. I have even gone so far, however, as to test this regime on myself, on several occasions, with great benefit as to comfort, following certain procedures necessary in my own case. I believe it is a plan we should use much more often than we do. In a considerable number of cases I have employed a device first suggested to me by Dr. Ellis Jones of Los Angeles; that is, keeping the patient lying entirely on his face following low back and spine fusion operations, *not* employing plaster-of-paris, or splint fixation at all. If

[10] THOMAS, H. O.: *Intestinal Disease and Obstruction*, 1883, pages 85-87.

the patient is kept in this position, and not allowed to turn over, and is protected as to his bowels for a week or two in the manner described by Mr. Thomas, the time immediately following and for ten days after the operation is usually much less stormy than in patients treated otherwise. In the old days when I put all of these patients, large and small, in double plaster-of-Paris spica and body casts, I had a good deal of trouble with abdominal distention and discomfort otherwise. It was necessary to resort to enemas, especially if opiates were being used, within a few days following operation. While it is true that one seldom has post-operative complications, as far as infection is concerned, in these days, it does make a lot of difference as to the patient's comfort and rest, and I believe even as to the eventual result, if the post-operative course can be smooth and comfortable in any position, with or without leg casts, and usually without body casts at all. Such a period of comfort after operation is quite certain if this careful control of the gastro-intestinal tract is observed, and abdominal distention and early bowel movements thus avoided. It is possible to observe, from this short excursion into the field of fractures in Mr. Thomas' work on intestinal obstruction, how he proceeds from this experience, in providing rest for the alimentary tract, to his application of the same principle to fractures, joint disease, and other extremity conditions. One should not fail to observe either that, in the use of drugs, medication is employed for definite and specific purposes, and much more accurately than much of the post-operative medication employed even in our own time. Mr. Thomas' use of few drugs, with few refinements, and with an obviously limited knowledge as to the effects of pharmaceuticals, in obtaining

results for his patients, can scarcely be improved upon even with our many refinements of medication, and the varied resources as to surgical procedures we have at the present time.

At one place Mr. Thomas said:

> If the theory of spontaneous cure of constipation, advanced in the previous chapter, be correct, then the question arises: "Is this knowledge of practical value in the treatment of all forms and degrees of constipation?" My contention is that this theory is the proper guide to treatment, and that the physician ought so to advise and prescribe as to gain—resolution without the aid of art. As yet the physician has not discovered any principle or remedy of which it can be said that it aids recovery, and sets aside the natural method.

And this also applies to the chemical cure of wound infection! (H.W.O.)

As to surgical intervention, time has shown that Thomas was ready for the aseptic method for laparotomy or joint disease. He said:

> There are only two indispensible remedies required for the treatment of these difficulties—opium and gastro-enterostomy. The former is indicated in every case, while the latter is required when symptoms show that the former must fail.
>
> When operative interference is indicated, that advised and practiced by Nelaton is the most advisable, viz., to incise the abdominal wall in the right side above Poupart's ligament, attach to the incision the first distended coil of intestine that presents itself, then puncture the gut and ignore the primary difficulty. This operation is easily performed, adds but little if any, to the danger, and should it be performed on patients in progress of recovery (unnecessary operation) I cannot believe that it can add any to the patient's difficulty.
>
> Nelaton was not the first, though he appears to have generally practiced this operation for the relief of obstruction (non-malignant case). It is on record that Mr. G. Freer of Birmingham, also Mr. Daniel Pring of Bath, performed the

operation of gastro-enterotomy for the relief of obstruction of a non-malignant case. This was in the years 1817-1820.[11]

Mr. Thomas' objection to the use of treatment that excited peristalsis or caused mechanical trauma to the abdominal contents was indicated in many places, e.g., the case of George Sand. He was even contemptuous of the obvious futility and danger in the following:

When feeding by the rectum is attempted, the distance the nourishing liquid travels is short, consequently only a small absorbent surface is traversed, and probably the absorbing power of the rectum is only slight. Enemata given for the purpose of feeding the patient reminds one of baiting with a salmon to catch a sprat. An enema for the purpose of unloading the intestine during health is not objectionable. It is a proper, ready, safe, and pleasant method of purgation, and is as much a hygienic habit as a daily bath.[12]

I have seen some frantic attempts at feeding (with much harm to the patient) that might very profitably have been dispensed with if the following had been remembered:

In these cases the most potent cause of emaciation is pain. It would be a much easier task to emaciate a person by inducing pain (which usually is accompanied by a loathing of food) than by a rigid curtailment of diet. It is wonderful how long a sufferer can tolerate even total abstinence from food when opium is given—as the drug appears to allay the feeling of hunger. At the period of resolution, the opium not being given so frequently ceases to keep the appetite in abeyance. I have known the case of a sufferer from acute enteritis who retained nothing but a drink of iced water, frequently repeated in small quantities, for forty-nine days, and yet recovered at the end of that long period

[11] THOMAS, H. O.: *The Past and Present Treatment of Intestinal Obstructions.* Reviewed with an improved treatment indicated, 1877, page 90.

[12] THOMAS, H. O.: *Intestinal Disease and Obstruction,* 1883, pages 145-146.

of abstinence not much emaciated; although previous to this complication the same patient had suffered from another painful affection of a malignant character to which she succumbed eighteen months after the relief of the obstruction.[13]

Thomas reverts, however, to the necessity for discretion. He saw, as we still do, patients hurried to the surgical amphitheater when their chances would be better on a program of rest. He said:

Surgeons again biased by the same errors as the physicians, have readily inclined to the conclusion that some one of the various methods of operative interference by a section of the abdominal wall, is the proper resort in these difficulties, and that such operations should be undertaken early. This has caused operative interference to be performed upon no more justification than the existence of the signs of obstruction.[14]

We may now turn to Mr. Thomas' attitude toward past and present treatment in bone and joint diseases. Although the quotation immediately following was written later, it is a statement of the position he occupied when he wrote his vigorous—if somewhat intemperate—attacks on the methods of Dr. Judson and Dr. Sayre in 1876, and his argument to the censor of St. Luke's Hospital in New York (Dr. Shaffer et al.). Mr. Thomas sets down, though he has done so on previous occasions:

The Principles of the Treatment of Fractures and Dislocations

During the last thirty years much progress has been made in surgery, by the introduction of changes of great importance, notably the discovery of anaesthetics and the method of exactly employing antiseptics. These additions to our art have mainly

[13] Ibid.
[14] Ibid., page 155.

been the result of much labor and thought, and the success attendant upon their employment has developed a general spirit of innovation, so that several modifications of past practice have been made and too readily accepted as improvements, often because they were novelties, but, neither being the result of sufficient thought, nor having been well tested by their projectors, some have been, and others are destined to be finally, set aside. Some of the latter I hope to point out in the following pages.

The history of the growth of surgery disproves the existence of innate or inspired ideas; surgery, like other experimental sciences, has had to be cultivated, and it was only after the expenditure of much toil and thought, during which surroundings have sometimes advantageously and at other times adversely influenced it, that individuals have successively advanced it to its present usefulness.

When commencing as a general practitioner of surgery and medicine, I was indoctrinated with several theories, some of which clinical experience has compelled me to abandon, among them being the belief that the permanent loss of motion, which sometimes remains after recovery from articular disease, is due to the immobility more or less employed during the treatment of this ailment. This change of opinion, as to the cause of articular anchylosis, forced me to inquire how it was that fixation of a fracture assisted its anchylosis; the conclusion I arrived at was, that while efficient fixation of a diseased joint tended to its earliest restoration to a normal condition and action, fixation did no more for a fractured bone.[15, 16]

Mr. Thomas, influenced by the words of John Hunter or on his own account, carefully reserved the right to change his mind and alter his practice. With regard to principles, however, and his devotion to his patients, he seldom varied. This explained much of his

[15] THOMAS, H. O.: *Principles of the Treatment of Fractures and Dislocations,* 1886, pages 1-2.

[16] It was from observations made during the treatment of diseased joints that I gained a better knowledge of the principles and the methods of treating fractures.

intolerance, and some of his intemperance of language, in dealing with those surgeons whom he considered to have fallen under the Biblical admonition "To him that knoweth to do good and doeth it not, to him it is sin." Dealing with one such American contemporary, he said:

In 1876 I published a *Review of the Past and Present Treatment of Inflamed Joints.* Although so titled, it was mainly and unavoidably a review of Transatlantic methods of treating diseased joints. Whether the publication of my views has influenced subsequent practice is a question I will leave others to decide. This we all know, that in this country, the practice of the so-called American method fell off so much, that it is seldom resorted to. Possibly, this notable decline may, in some degree, be due to our not being favored of late years with periodical visits from the great apostle of the American system. In the *Lancet* of December 2nd, 1889, Dr. Judson, in an article titled *The American Hip-splint,* gives the readers a history of the splint with the etiology, diagnosis and mechanical treatment of hip-joint disease. The best refutation of Dr. Judson's paper published in the *Lancet,* was written by himself, and published in the *New York Medical Review,* May 1st, 1886, which article is a recantation of the opinions regarding the principles of the treatment of joint disease, published by him in the *New York Medical Record* of July 7th, 1883, which, notwithstanding his recantation, he again reproduces in the *Lancet* of December 2nd, 1888. His renunciation was a full acceptance of the principles of my teaching, giving me only a covert acknowledgment in the following words: "I have none of my fellow workers in view; we have all been followers of Dr. H. G. Davis." The lecture was an epitome of my writings. While Dr. Judson was endeavoring to revive the American method here, another surgeon, Dr. Shaffer, of New York, was placing the principle and the methods of treatment which are growing in favor in this country, in his surgical balance, and since has decided that they were of short weight. He mentions as one of its faults, that it is "old-fashioned." To this I will not object, and against it he points to the American method, which is "totally new;" to this, again, I cannot possibly object, believing this to be the *only* merit it can claim. That my

predecessors, for the last hundred years, worked upon the same lines as myself, does not add to my reputation, but the past cannot be undone, and it is my duty and pleasure to fully acknowledge their labours.[17]

Turning to another American surgeon who, in the opinion of Mr. Thomas, wrote "not wisely but too well," Mr. Thomas says:

That much may be written and yet very little known of the principles of the treatment, is proved by the following extract: "There are many cases in which the inflammation is so violent, and the pain upon the slightest movement so intense, that *absolute rest* is requisite for a time, and in such cases the fixed dressing alluded to answers a most excellent purpose. Under these circumstances I employ most commonly the cuirass with extension. But *motion* is as essential in retaining a healthy condition of structure about a joint as light is essential in retaining a healthy condition of the eye; for the ligaments around a joint will become fibro-cartilaginous, or even osseous, if motion is denied them, particularly if a chronic inflammation is going on within the joint with which they are connected. It was in consequence of such accidents occurring in several instances that I was led to contrive some plan by which extension could be maintained that would remove pressure from the acetabulum and the head of the femur, and at the same time permit motion of the joint, thereby retaining the capsular ligaments in a healthy condition. But rest is essential to a healthy joint, in order that motion may be tolerated by it." [18]

Of all the glaring errors and contradictions, that are to be met with in special treatises written on the subject of articular disease, no publication which I have ever met with, contains statements so irrational and contrary to our clinical experience as are taught in this volume. Indeed, the volume is composed, partly of facts but mostly of assertions, and the latter appear as if intended as counterblasts to the former.

[17] THOMAS, H. O.: *Fractures, Dislocations, Deformities and Diseases of the Lower Extremities,* 1890, pages 268-269.

[18] SAYRE, L. A.: *Orthopedic Surgery and Diseases of the Joints,* 1876, page 260.

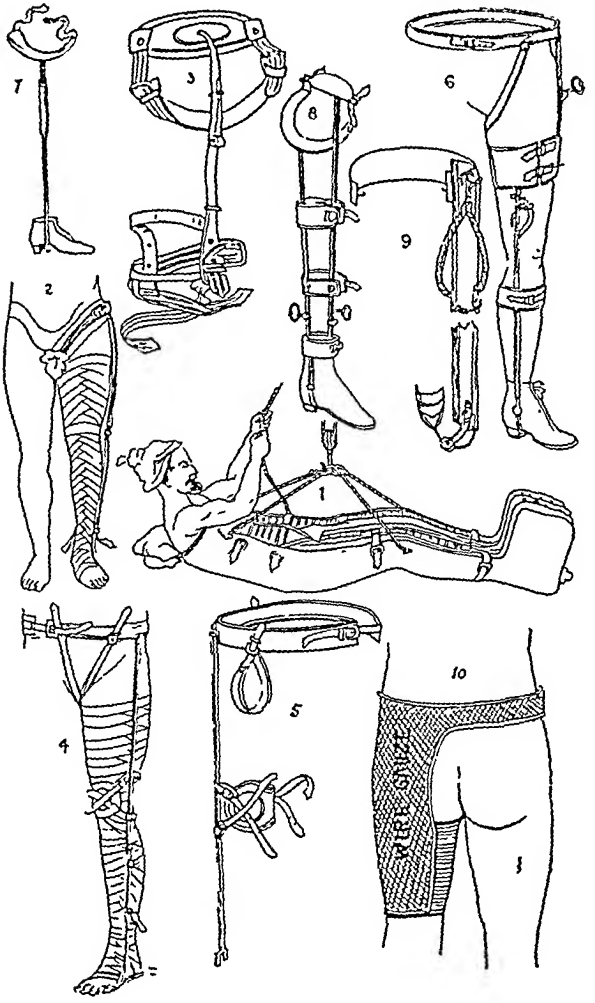


Fig. III. (1) Bonnet's grand appareil. (2) Davis' hip appliance. (3) Sayres' hip appliance. (4) Taylor's hip appliance. (5) Washburn's hip splint. (6) Hutchinson's hip splint. (7) Dr. Andrew's ischiatic crutch. (8) Bauer's hip appliance. (10) Hamilton's hip splint. (From Thomas, Hugh Owen: *Diseases of The Hip, Knee and Ankle Joints,* T. Dobb and Co., Liverpool, 1876.)

Here are other extracts showing the same eccentric bias: "When this instrument is employed, it is necessary that the child should be taken from it very frequently, and have all the joints carefully moved, otherwise too long continued rest of the joints may end in anchylosis. In moving the diseased joint, care must be taken to hold the pelvis, and to make slight extension upon the diseased limb when motion is given to the joint. Perfect rest, long continued, even of the diseased joint, is decidedly injurious, as there is danger of its resulting in anchylosis. On the contrary, motion of the joint without pressure is not only not injurious, but it is highly beneficial." [19, 20]

Mr. Thomas had seen motion do harm in every brace that failed to put an inflamed or tender joint at rest. In a word, he "knew better" and said so!

Especially after the visits of Dr. Ridlon to Liverpool —when Ridlon had learned the soundness of Thomas' teachings and had admitted Thomas' far better clinical results—Ridlon's chief, Shaffer, became a shining target. Moreover Shaffer had, for years, been writing himself into a vulnerable position for all of Thomas' weapons of criticism and debate. For example:

In the year 1879, Dr. Shaffer published a volume entitled *Pott's Disease; Its Pathology and Mechanical Treatment.* It is an excellent contribution to the surgery of this ailment. At pages 40, 41, and 42, he tersely shows the evil and the defects of the 'plaster plus traction' method of treating spinal disease. He, like myself, has adopted a modification of Dr. Bauer's posterior shield. We all like to modify the work of our teachers, I suppose, because it will be assumed by our contemporaries that a modification is a second and improved condition. However, to return to the traction question, the posterior spinal support of Bauer and its modification by Shaffer and myself, act upon the principle of lever and fulcrum, and

[19] TAYLOR: *On the Mechanical Treatment of the Hip-joint,* page 15.

[20] THOMAS, H. O.: *Principles of the Treatment of Diseased Joints,* 1883, pages 28-29.

to be effective it must act continuously for a period varying from one to three years. The following is Dr. Shaffer's description of its action.

"I may state, further, my views in general upon the comparative merits of the antero-posterior support and the plaster jacket. The former acts scientifically upon the principle of a lever with the fulcrum at the point of disease." [21]

On page 284 of the same volume we find the following:

From reading we might suppose that Dr. Shaffer reduced hip-joint deformity by a method fundamentally different in principle from that of the "Thomas splint." It is not so! The difference is merely a question of time; the tractionists occupy months, where the "Thomas" takes but a few hours in reducing the deformity. Traction "in the line of deformity" would be endless traction. How is it possible for a flexed hip-joint to have its angle from the plane reduced if the traction is constantly at that angle? If the deformity is to be reduced, there must be a diminution of the angle to the plane, during which there is constant intra-articular pressure upon the upper or lower segment of the acetabulum, as a fulcrum: by the Thomas splint it is done rapidly by the weight of the locked knee, often in a few hours—seldom a week. If we take the evidence of Messrs. Taylor and Marsh, the time expended in reduction by traction may extend over several months; further, Dr. Taylor, in his writings, is careful to warn us against over-traction, which he has known to damage even the healthy joints in the neighborhood of the diseased one. Dr. Shaffer appears, from his writings, to follow the practice of Dr. Taylor. As to the "assumed" and "supposed" "fixation" and "rest" assertion made in this paragraph, I make an opposite assertion, easy to be confirmed by experiment: That the flexion test of the presence of, or recovery from, disease, is a rigid scrutator which any one, trained or untrained, can employ as a surgical auditor. By the adoption of which procedure nothing is left to the judgment of either an interested surgeon or a dissatisfied patient.

[21] THOMAS, H. O.: *Fractures, Dislocations, Deformities and Diseases of the Lower Extremities,* 1890, page 278.

One of the objections to Thomas as a teacher arises out of his tendency to repeat. But like other preachers (which he was) there is often reason for his telling us what he is going to say, then saying it, then telling us what he has said. Elbert Hubbard expressed it too, when he remarked; "It is a long and difficult search to find the man who will do a thing by being told *once.*"

We shall do well to listen to Thomas while he gives us in different ways his views upon the dangers of "movement" whether by bone-setters, or by ill-advised "regulars" like (for example) Championierre or Willems.

Of late, bone-setting has been the subject matter of volumes otherwise containing valuable contributions to surgery. It has also formed the topic of debate in medical societies, during which innumerable explanations of reported successes by the practice of bone-setting have been advanced; and if the present ignorance in regard to the subject is to prevail, the number of solutions can only increase but never solve the question. That a writer may argue this question and cross the whole ground of debatable matter relating to bone-setting, in a manner satisfactory to the present investigators of this question, it is very evident that he must possess some qualification beyond having acquired a diploma which indicates that he has had professional training, and a high value seems to be set on personal observation of, and experience in, the practice of bone-setting. It has fallen to my lot to have those two qualifications, and, as regards the extra-academical one, my opportunities of observation have not been limited to the watching of the method of one unqualified practitioner of surgery but of many, the majority of whom had possessed a widely popular reputation; nay, they had among their proselytes even surgeons of good professional repute.

My contention is this, that in the practice of bone-setting nothing is to be found that can be added to our present knowledge, yet discussing the matter will show us our own ignorance. That some of the bone-setters, who practiced in past time, were in some few special matters superior to their qualified

contemporaries, I know to be a fact, but this assertion does not apply to their general knowledge or practice. And concerning diseases of joints, I never met with the slightest evidence that any of them had any knowledge of the subject or a method of treatment which was not utterly wrong.[22]

Then, one may ask, why do we still have osteopaths and chiropractors who have not even hereditary skill or family training to justify their practice as a pretended inheritance from the bone-setters?

Further on this subject Mr. Thomas says:

Some of my readers may think that the space occupied by criticism of the use of manipulations in the treatment of articular disease, is more than the subject deserves. But inasmuch as our textbooks of surgery—used by the students of today, the surgeons of the future—are all infected with the erroneous teachings which I have here tried to controvert, and, as its acceptance or rejection must seriously affect our practice, either for better or worse, it is imperative that the question should have been fully debated.

Until the principles and the proper method of the treatment of articular disease have been demonstrated, most unsuccessful cases will generally be placed to the credit of wrong treatment. It is so with all ailments, the treatment of which is mere empiricism. The fact is often forgotten, that many of the cases of joint disease are only local manifestations of a constitutional flaw, which, even though the articular lesion be cured, will finally defeat both our surgery and medicine by its recurrence in parts essential to life.[23]

[22] THOMAS, H. O.: *Principles of the Treatment of Diseased Joints*, 1883, pages 63-64.

[23] Ibid., pages 145-146.

CHAPTER II

Rest as The Fundamental Factor in The Relief of Pain and The Arrest and Cure of Inflammation

MANY OF OUR correct ideals with regard to treatment of wounds and fractures were inherited from Hunter, Hilton, and Hugh Owen Thomas. In a period in New York surgery, fifty years ago, tuberculosis of the hip or morbus coxarius was being treated by machines or apparatus designed to provide immobilization and traction (but especially traction) for the hip. After many years of travail, during which the Sayre, Washburn, Stephen Smith, Hutchinson, Bauer, Shaffer, Duncan Eve, Wyeth, Stillman, and Roberts splints were devised, manufactured and applied, we came to the point where real immobilization and rest were obtained by the Thomas splint; much simpler, lighter in weight, more efficient and less expensive; or by the plaster-of-Paris cast. During those days we had advocates of radical surgery, motion, ambulation, and even chemotherapy for tuberculous joints—but not any more.

We know that rest rather than radical surgery or

medication will assist patients to recover from tuberculous bone and joint disease.

But we have not made so much progress in the matter of compound fractures. There have been too many attempts to individualize therapeutic technique and apparatus for different patients, different occasions and especially for different splints and surgeons to arrive at standard methods, continuity, or systematic treatment.

A common admonition of surgeon-teachers is that the surgeon on the spot in an emergency must decide the special apparatus, methods, and program appropriate for any patient. Every surgeon should have in mind that certain fundamentals, such as, restoration to normal position, immobilization, control of hemorrhage, and protection against further trauma and infection are essential and should always come first.[1]

At about the same time as Lister's original work, Hugh Owen Thomas of Liverpool, was teaching a method of control of inflammation and infection which rested upon a different principle. He stressed the ability of the patient to recover from various bone and joint diseases under circumstances and conditions designed to favor only the most efficient employment of the patient's own defenses.

Regarding the Lister method, Thomas said:

> For some years previous to the introduction of the antiseptic method, I practiced the open method and was well satisfied with the results obtained, but on the publication by Professor Lister of his successes, I at once commenced the practice of antiseptic surgery (this was as first taught by Lister, and included the carbolic spray. H.W.O.) and continued to practice it for three years, with the result of being perfectly satisfied that its merits have not been over-stated nor the trouble necessary for carrying out the details exaggerated. I returned, however, at the end of that

[1] See my remarks on this, Chapter I, page 25 (H.W.O.)

time to the open method, and have since laboured to improve it, so much so that I am emboldened to assert that the open method, in results and successes, is equal, if not superior, to anything to which antiseptic treatment has yet attained.

Thomas was quick to see that the Lister method, which tampered with wounds and disturbed the patient, violated the principle of repair by rest which was so significant to him. Thomas understood, as few before or since have understood, *the importance of providing true physiological rest for the patient.* He pointed out on many occasions the tendency of the patient toward spontaneous repair and said that nature always has a mode of operation if the surgeon can only understand and employ it. He recognized the teachings of Hilton, the great apostle of rest, but said that Hilton's efforts at immobilization were inadequate because he did not know how to apply splints or apparatus without compression or constriction of the affected part.[2]

A satisfactory demonstration of the influence of rest in limiting the spread of local infection and inflammation has recently been supplied by Trueta and Barnes.[3] Trueta had accepted my suggestions regarding the plaster-of-Paris immobilization and infrequent dressing method in his war work in Barcelona in 1938. He was most generous in his acknowledgment and in giving me credit for the program he adopted in his treatment of more than one thousand cases of war wounds and compound fractures with only six deaths. It has been a matter of regret to me that in his later work he has been led away from wound and fracture protection by

[2] ORR, H. W.: *The President's Address: The Contribution of Orthopedic Surgery to the Lister Antiseptic Method,* Journal of Bone and Joint Surgery, Vol. XIX, No. 3, July 1937, pages 575-583.

[3] Trueta and Barnes: *British Medical Journal,* 2:46, 1940.

diversions like sulpha and other kinds of drug therapy for wounds, primary and secondary closure, and what appears from his writings to be less than the meticulous immobilization in correct position that Thomas (and I!) required. But Trueta and Barnes have shown by laboratory experiments not only that toxins and infections are carried from the legs and arms by the lymphatics (instead of by the blood), but the causes of inflammation and systemic toxemia (pyemia, septicemia, etc.) may be isolated in any affected extremity to a very considerable extent by immobilization in plaster-of-Paris casts as well as by litigation. Conclusive evidence was adduced by their experiments to show that the lowered pressure and slowing down of the lymphatic circulation by plaster-of-Paris alone would protect the patient for many hours against snake venom or a bacterial toxin that would cause death otherwise in a matter of minutes. Moreover, removal of the casts, some hours after the injection, precipitated the same sudden death that would have occurred earlier if the immobilizing plaster-of-Paris had not been put on.

This, it will be seen, rationalizes the entire immobilizing therapeutic program. It confirms everything that has been said (on an empirical basis) about the importance of rest as a principle in surgical and physiologic treatment. How Hilton and Lister could deviate from this principle was always a mystery to Thomas and how so many of our teachers of surgery can do so now is a mystery to me.

Hugh Owen Thomas became a disciple, which he admits freely, of both John Hunter and the famous "Apostle of Rest," John Hilton. Mr. McMurray has expressed this for us in a few words:

When he read Hilton's work on *Rest and Pain* (1st Ed.

1863) he was struck with its evident truth—here at last was a book with whose teaching he was in complete agreement. It supplied reasons why rest in which he so firmly believed should be used in the treatment of inflamed and injured tissues. In his copy of Hilton's work, which he read and re-read, he had underlined the following paragraph, "It will be well, I think, if the surgeon can fix in his memory as the first professional thought which should accompany him in the course of his daily occupation, this physiological truth that Nature has a constant tendency to repair the injuries to which her structures have been subjected, whether these injuries be the result of fatigue or exhaustion, of inflammation or accident. Also that the reparative power becomes at once most conspicuous when the disturbing cause has been removed, thus presenting to the consideration of the physician and surgeon a constantly recurring and sound principle for his guidance in his professional practice." [4]

But Mr. Hilton removed to London and became a popular, successful, and prosperous city doctor. In so doing he not only failed to devote himself, as Thomas did, to ways and means of securing for his patients the kind of rest Thomas considered (and knew) was essential, but even recorded cases for publication in which the factor of rest had been neglected. Thomas was quick to point out for Mr. Hilton, as he did for so many others, that rest is not an item of technique in therapy but a guiding principle—or nothing.

The use of rest in intestinal and intra-abdominal conditions has been discussed in the preceding chapter. The following comments indicate to what lengths Mr. Thomas was willing to go both for his patient and on his own account.

In the treatment of this case forty-five grains of morphia were consumed, and the treatment extended over thirty-two days; altogether one hundred visits were made. Of these I made,

[4] McMurray, T. P.: *The Life of Hugh Owen Thomas*, 1935, page 17.

daily, the second and often the evening visit. Being in ill health at the time, I found the second visit difficult. Most of the morning and evening visits were made by my nephew, Mr. R. Jones, who very efficiently assisted me.

When first called to this case I suspected that it was one of intussusception; and as no preliminary ill-treatment had been practised, I thought that the patient must certainly get well if no deviation from my mode of treatment occurred. To the mother and wife of the sufferer were explained the nature and seriousness of his malady, and also the importance of strict adherence to the advice Mr. R. Jones and myself should give; and much credit is due to his relatives for the faithful way in which our instructions were carried out, despite the meddling of spiritual advisers and also of nurses connected with a charity.[5]

With regard to Mr. Thomas' strictness in these matters, I have either read elsewhere, or was told by Doctor Ridlon, that he exercised stern discipline in dealing with other members of the family, in these cases. When he was in doubt as to compliance with his instructions by those in attendance upon the sick person, or where he doubted that full cooperation was being obtained, he was accustomed to say that if the patient died, an autopsy examination would be demanded of the coroner, and that if any particles of food were found in the patient's stomach or intestinal tract, the person responsible for supplying food would be charged with contributing to the death of the patient. Fortunately, as in the above case, the patient's family was more often fully cooperative than otherwise and nearly all of Mr. Thomas' patients reposed the greatest possible confidence in him, and were obedient to his instructions. This was illustrated in numerous ways and upon many occasions.

The importance of the relationship between Mr.

[5] THOMAS, H. O.: *Intestinal Disease and Obstruction*, 1883, page 211.

Thomas' care of patients with intra-abdominal lesions and his work in the care of diseased joints is only rarely appreciated. Dr. Ridlon spoke to me often about this when I became a graduate student in orthopedic surgery in 1904 and gave me Thomas' book on *Intestinal Obstruction* to read before any others. Sir Arthur Keith expresses it very well:

> If I were to cite an instance to illustrate how his conception of rest and the manner in which his methods of treatment differed from those of all the men who had gone before him, I should select it, not from his papers on fractures and diseases of joints, but from one which he regarded as of great and lasting merit, that in which he describes the best means of treating cases of obstruction of the bowel—In his treatment of such we obtain a concrete illustration of what he means by rest.[6]

I feel justified in recording here, that this is what I had in mind when I protested the Carrel-Dakin method in 1918-1920, and why I entirely abandoned frequent chemical dressings and rubber drainage tubes in infected wounds and compound fractures twenty-five years ago.

Yet only now, seventy years after Thomas, our general surgeons have just begun to limit their exploratory operations in abdominal cases, not to traumatize the already inflamed contents of the abdomen, to omit gauze packs, wicks and drainage tubes, and to leave, in large part, resistance to infection and repair to the patient.

Before and after his important "Contribution" on *Intestinal Obstruction,* Hugh Owen Thomas had been chiefly concerned with diseases of joints. His many experiences with fractures also contributed both to his

[6] KEITH, SIR ARTHUR: *Menders of the Maimed,* 1919, page 45.

conclusions and his convictions as to the importance of rest. He says:

> No matter what the primary cause of disease in a joint struma, rest cannot be dispensed with, for, if surgery does not step in, Nature is sure to intervene by a muscular method, knowing that arrest of motion is the one thing needful before all others. In man's evolution it was his only chance of recovery from hip joint inflammation.

You see here how, from the very first, he dwells on the lesson taught us by Nature in her efforts to secure immobility by muscular action. He based his conclusions on the observations of a thousand cases extending over a period of nearly twenty years. He was led to the conclusion that by prolonged and uninterrupted rest in a suitable appliance his cases nearly always recovered, and very rarely with deformity. Although rest was advocated by many of his contemporaries, he found upon a study of their writings that a very large proportion of their cases ended in excision and death. This was quite contrary to his own experience for his patients very rarely died and excision was not required. This, he maintained, was due to the fact that surgeons did not understand the full significance of the term "rest," which they applied intermittently and inefficiently. First, however, they did not possess any reliable test for the early recognition of disease, nor did they know when resolution had occurred.[7]

In the early days of orthopedic surgery in New York, Dr. Bauer characterized H. G. Davis' use of traction in hip disease as a clumsy and inadequate attempt at securing immobilization and rest. This was also Thomas' view. He railed against the "American Method" of

[7] WATSON, FREDERICK: *Hugh Owen Thomas, A Personal Study*, 1934, page 74.

Davis, Phelps, Sayre, and Shaffer and all other "tractionists" who even admitted their poor results in print when they used either weight and pulley or gravity with movement of the affected joint.

It was this situation in New York and a reading of Thomas' book on *Diseases of the Hip, Knee, and Ankle* that took Dr. Ridlon to Liverpool in 1887. (See Chapter VIII and Dr. Steindler's "Supplement".)

Thomas said:

I will here give my reader a very condensed summary of my theory of treatment, which will be found in full detail and defended in previous "Contributions."

First: The defective part must have the greatest amount of *relaxation from the performance of its usual function during* the abnormal state:

This being gained sometimes by the direct method, that is, applying our means to the abnormal part, if its recuperative power has not been so diminished that this method would not lead to a cure; but should the vitality of the part have become vitiated, then the indirect method of treatment ought to be adopted; this is, our means can be applied to neighbouring sound parts and so control the abnormal ones.[8] The direct method is, in practice, more mechanical than physiological in effect; by the indirect method our mechanical treatment can be applied very efficiently, and the vitality of the part is only very slightly interfered with, while we almost totally avoid one of the serious errors of our past practice—the treating of

[8] Mr. Thomas made this distinction between a compression bandage to the knee, for example, with or without medication and perhaps short splints—"the direct method"—and a long splint—posterior iron or caliper—by which the entire extremity and the affected joint could really be put at rest—"the indirect method." It is interesting that we make the same distinction now in the matter of controlling fracture fragments, "direct" by means of plates, grafts or pins at the fracture site, or "indirect" when the fragments are controlled by pins through the bone remote from the point of fracture and fixed in apparatus or (better!) in plaster-of-Paris casts. (H.W.O.)

our cases too mechanically, as though the part was only a disturbed portion of inorganic matter.

Second: That we cannot correctly attribute any defect that may remain to the length of time of relaxation from action of the part during the unsound condition.[9] For, if the part can recover at all, the repose we can get for it only gives the part a tendency to completely return to or approach as near as possible its previous condition of health.

Third: As soon as the part under treatment has become healthy, it will resume its function more fully and readily rather by the attempts of the late patient to use the part than by supplemental violence.[10] Such are passive motion or any violent manipulations.

Fourth: that the signs of incomplete cure are mainly physical. If the part be sound, its range of function increases with use; if yet imperfectly healthy, use will not increase it.

Fifth: That to reduce all deformities, some degree of unsoundness ought to be induced, so that they may be corrected without disrupture of parts.

When correcting deformities of parts already unsound, the act increases the malaise, hence the importance of at first quickly gaining the desired form, and then of avoiding any deviation from it. When correcting parts healthy when presented to us, we can, by patiently producing more or less unsoundness, alter the form of the parts without any disruption. This can be done on the living subject safely and effectively by physiological accommodation, while, on the dead body, it could not be brought about except by laceration.[11]

This is Mr. Thomas' argument for gradual correction of contracture deformities by application of the splint to fit the deformity and gradual correction of the limb and the splint with his wrenches over a matter of days or weeks as required. Now, we do that some-

[9] (Ankylosis is the result of pathology—not of rest.)

[10] (A warning to bone setters—and physiotherapists!)

[11] THOMAS, H. O.: *Fractures, Dislocations, Disease and Deformities of the Bones of the Trunk and Upper Extremities,* 1887, pages 3-4.

what better, I think, and have better control of our patients, and with more comfort, by occasional changes of plaster-of-Paris, using anesthetics if necessary.

This *can be done,* as Mr. Thomas has said, on many occasions, better during periods of "unsoundness" whether in joint disease or fractures, simple or compound *if* the affected parts are truly immobilized and movement and muscle spasm properly controlled, by the surgeon—before and after the operation.

Thomas' appreciation of natural "principles" had been indicated earlier (in 1883) by his anticipation of Wolff's Law.[12]

We hope that our notes will not offend those who consider them superfluous, but the above is one of the passages that lays Mr. Thomas open to the charge of obscurity and repetition. But if one has read that part of his previous discourse which has to do with diagnosis —soundness and unsoundness in joints, and has mastered his instructions as to the reasons for and the means for securing immobility, and if we have learned when not to permit motion, and when to resume function—*then the ink and paper for the above resumé will serve a purpose.*

Some philosopher has remarked that those who can read, and do not, are in just as bad a case as those who cannot read at all. This comment refers unfortunately to many members of our medical profession. Some who have criticized Hugh Owen Thomas as a teacher must have failed to read much of the material that he has laid before us. Many of those who object have found their own teachings and practice disturbed by the directness and dogmatism of his precepts. Any one who reads enough of Thomas, however, to become thoroughly

[12] Bick: page 92.

imbued with his fundamental teachings, will find him not only interesting but helpful in the care of fractures and bone and joint disease. Thomas was liberal as to details of technic, but in making distinctions like those between lateral splints, in hip and knee disease, and the posterior support which he devised, he demonstrated to his own and our entire satisfaction that any lateral splint fails to provide the same kind of support for a patient with hip or knee disease either ambulatory or in bed, as is provided by the well-fitting posterior bar, which Thomas made, and fitted more carefully than anyone else.

The application of the Thomas splint, in such a case as the following, for example, provides surely such a lesson in clinical care, as can be found in few textbooks, even at the present time.

In June, 1874, Mrs. D. residing at Santander in Spain, brought her daughter, a child ten years of age, to have my assistance. The child suffered from chronic inflammation of the knee joint, and right angle flexion, with acute tenderness, and constitutional irritation. She had been a sufferer for nine months previously. The limb was placed in one of my appliances. The knee joint was aspirated, removing about one ounce of fluid. In the fourth week, she was going about without assistance even from the crutches, although her previous sufferings rendered the crutch indispensable when taking exercise. The patient stayed at my hospital four months, at the expiration of which time her joint was painless, there was no deformity and no effusion. (During this time, Thomas was, of course, straightening the posterior bar at the knee, and at the hip, in such a way as to reduce the deformity gradually, and without at any time disturbing the complete immobilization upon which he insisted.)

When she left the hospital, she returned to Spain, and Mrs. D. reports her daughter as doing well, and not requiring any further medical or surgical assistance. In this case, I would suggest that the pain was the sole cause of the constitutional

disturbance. (It seems likely, that Mr. Thomas was mistaken about this, as he had no x-ray for diagnostic purposes. The child must have had some infection and possibly, even some damage to the articular surfaces of the knee, that might have been demonstrable by x-ray.) And I was confirmed in my view for as soon as complete mechanical rest was established, the general health improved rapidly without my prescribing, and the angular deformity gradually disappeared, from my adjusting the limb. In this case, aspiration was performed, an operation in my experience not merely harmless, but one which can be resorted to early with benefit to the patient.[13]

In our time, we think we can accomplish the immobilization better by the use of plaster-of-Paris. If one views the details of Mr. Thomas' technic, however, it is apparent that he secured much better immobilization with the posterior iron than most of his associates and followers. If we can use the Thomas posterior hip and knee splint, as Mr. Thomas did, plaster-of-Paris becomes *relatively* less important. Skillful use of the plaster-of-Paris cast in small children, however, or in those who are difficult to control (especially as double leg casts with fixed traction and a cross bar), is the plan which we have been employing for many years.[14] This corresponds to the double abduction splint, which is said to have been worked out by Sir Robert Jones, with Mr. Thomas' single posterior hip splint, as an original basis for the later apparatus. The fixation of lower extremities in this way, after operations for acute osteomyelitis or compound fractures, has now become general.[15] The use of skeletal

[13] THOMAS, H. O.: *Diseases of the Hip, Knee, and Ankle Joints*, 1876, Case 11, page 120.

[14] Clipping from reprint. (H.W.O.)

[15] A personal experience may be permitted. While I was on duty with the British in Wales in 1917, Sir Robert Jones operated upon a young patient at Cardiff. Major Alwyn Smith and I assisted. The operation was an upper femoral osteotomy for an adduction- →

fixation pins (not wires) in plaster-of-Paris represents, in our opinion, the only substantial improvement in the technique for maintaining correct length and position—and rest—since Thomas himself.

I should not have been so much impressed with my qualifications for this excursion into the history of orthopedic surgery except for an incident that occurred not long ago. At a meeting at Lansing, Michigan, I noticed from the table where I sat at dinner a very lively doctor more or less dominating the conversation at his table. I asked, and learned from the chairman that he was Jimmy Breakey. "Oh!" I said, "I earned part of my way through medical school working in the Breakey home in Ann Arbor." So, Dr. Breakey was sent for, and I met a charming middle-aged man with some of the traits of the Breakey family that I remembered at once.

"It is a pleasure to see you again," I said, "I knew you as a school boy when I was a student in your father's house about 1899."

"Oh no!" he said, "That was my father. The old doctor was my grandfather!"

Mr. McMurray has expressed, better than we can, Mr. Thomas' continuous and consistent interest in rest as a guiding principle for all surgical treatment.

← flexion deformity of the hip. The patient was so unhappy in the double abduction splint that we got permission to put her in a double spica cast on the third day. She was relieved at once and made a good recovery. One of Sir Robert's most distinguished pupils, Mr. McCrae Aitken, was using a good deal of plaster at Hammersmith in London at that time.

When we found the splint situation so unsatisfactory at Savenay, Base Section No. 1 A.E.F. in 1918, Colonel Goldthwait obtained permission for us to use plaster-of-Paris for the evacuation of patients to the United States. In World War II, happily, I think, the plaster, infrequent dressing program became generally acceptable.

Later, in his *Review of the Past and Present Treatment of Inflamed Joints,* published in 1878, he analysed the results of those who had advised passive movement, and concluded by reaffirming his belief that "Rest is a remedy, an overdose of which it is not possible to give the patient."

To Thomas it was not sufficient that the principle of rest should be conceded. If rest was to be the aim of treatment, then the tissues must be controlled so that movement could not possibly occur. Constricting bandages or plaster which would interfere with the normal circulation must be avoided. There must be no restriction on the amount of blood flowing to the injured tissues, but there must also be no abnormal increase, such as would be produced by the application of counter-irritants to the area under treatment.[16]

Our recent campaign (since 1923) has been for the extension of Mr. Thomas' practice to better protection of wounds against chemical irritation and secondary infection (by infrequent dressings) and better control (even than by Thomas' splints, we think) of these wounds and fractures by skeletal fixation in plaster-of-Paris casts. This represents we believe real progress, and not as so many "modifications," "improvements" and gadgets do, a step backward from the teachings and splints of Thomas.

In his *Contributions,* Part II, 1883, which is Mr. Thomas' principal contribution to the literature of orthopedic surgery, he demands, as usual, consideration of the fundamental principles involved in the diagnosis and treatment of joint disease. He suggests correctly that any lack of regard for injury, improper motion, irritation, and muscle spasm, as factors in the cause or aggravation of joint disease, leaves a surgeon unprepared to deal with those factors or to undertake the

[16] McMurray, T. P.: *The Life of Hugh Owen Thomas,* 1935, page 18.

treatment of a patient suffering from injury or infection. All factors in the etiology, he says, must guide in the correct treatment and control, both of the affected part and the patient. This leads directly of course, to the importance of protection against improper motion, against repeated traumas, and against any damage which the patient may do himself, or which may be inflicted upon him under the conditions and in the environment in which he lives. Conduct, activities, diet, occupation, and all of the other factors which enter into a patient's ability to protect and take care of himself, or of the surgeon to take care of and protect his patient, must have the consideration of the surgeon from this fundamental standpoint. As one reads more and more of Mr. Thomas' writings, of the description of his cases, and of his methods of treatment, it will be observed, that in everything he says, these fundamentals are kept constantly in mind. In every detail of his surgical care, his physical therapy, and of his use of apparatus, as well as other expedients in treatment, he is influenced and guided by these fundamentals, and all of the rules he prescribes for others are constantly observed.

Mr. Thomas did not hesitate to quote from others, out of his wide reading, and to give credit to his predecessors or contemporaries when he found them in accord with his own experience or practice. For example, he cites the following from Dr. Bauer to support his own views regarding joint pathology and the symptoms of joint disease:

> The pathological character of this period is expressed by structural invasions of a more decided nature; by more copious infiltrations and effusions within the joint; by reflexed pain, muscular spasm and consequent malposition; and, in fine reactive

disturbances of the constitution. If the patient has been properly attended to at the first stage, the disease will but rarely advance to the second; and if the local affection was of a nature that could not be checked in its advance by due precaution, the second stage will be at least materially mitigated by the previous treatment. Assuming, however, that the patient comes under your charge with the full pathological and clinical force of the second stage, the same remedies and appliances commend themselves; for *rest* and *position* are the imperative axioms whilst the disease is in active progress.[17] (See Plate VII)

Thomas' respect for Bauer, indicated by several references to him as "the best exponent of American Orthopedics," is not only justified by Sir Arthur Keith but in such a way as to suggest (if necessary) that Thomas was always the careful student and the sound practitioner we represent him to be. Of Bauer, Sir Arthur Keith says, "We have only to open his pages to see that he had mastered all that Marshall Hall, Delpech, and Duchenne had to teach him. He was an unflinching advocate of the beneficial action of rest."

Whether the rising generation in New York—Taylor, Sayre, and Shaffer—were the cause, or not, Bauer removed from Brooklyn to St. Louis!

The diagnosis having been made, the indications for treatment, in Mr. Thomas' experience, became almost automatic. It was a part of his crusade to convince others of the soundness of his philosophy. And why not? Observe how firmly his confidence rests upon his qualifications in the following:

For successfully treating all degrees and phases of articular disease, the surgeon must possess an unbounded but intelligent confidence in the efficacy of rest as the foundation of all treat-

[17] BAUER: *Lectures on Orthopedic Surgery,* 1868, pages 277-279, and THOMAS, H. O.: *Principles of the Treatment of Diseased Joints,* 1883, page 30.

ment; and, next in importance, he must accept what is described in this volume, as an infallible test of the progress or resolution of the disease. This method is not an ideal one, not a rule made to meet a demand, but is merely a conveyance into print of that which has been hitherto uninterpreted by surgeons, though the information has always been openly tendered to us by nature. There are, in general use, other mechanical means employed for the treatment of diseased articulations; for instance, counter-irritation, shampooing, passive motion, and electricity. To the surgeon, who has mastered the principles proper to the treatment of inflamed joints, these terms can convey no useful meaning, as the operations which the terms imply are used with intent to secure an end, which he would see they cannot possibly aid in obtaining.

By acquiring a knowledge of certain principles essential to the successful treatment of articular disease, any surgeon, possessed of ordinary intelligence, may correct articular disease, though he may have had no previous experience in this department.[18]

This observation equally applies to the correction of the conditions known as deformities of limbs, whether they be congenital or non-congenital; and to the correction of deformities again, there appertain certain hard and fast rules, by attention to which no special experience is required, as some surgeons would have us believe. These rules, if attended to, enable the recently fledged practitioner to outstrip his predecessors in the field, no matter how long or how extensive may have been their opportunities, if they should be ignorant of, or ignore in practice of, certain principles. Now that mechanical adjuncts for carrying out practically, that which is theoretically proper, can be secured at a market price of a shilling instead of the guinea, which in past times had to be invested, all practioners are independent of the costly tackle pertaining to specialists and endowed institutions.[19]

[18] The obvious implication being that the surgeon who does not have the necessary training and experience to treat joint disease must permit Mr. Thomas to tell him what to do! And again, why not?

[19] THOMAS, H. O.: *Principles of the Treatment of Diseased Joints*, pages 48-49.

And here again is a respect in which there has been a complicated and expensive trend away from Thomas. Some of the gadgets and gadgeteers have even outstripped themselves—they run beyond the ability of anyone to pay for them and of anyone—even their originators—to put them to intelligent use. Every large hospital has a room filled with bolts, bars, and bedevilments which were used but once if at all.

Mr. Thomas was severe in his criticism of those passages in the writings of Britsh surgeons which he had demonstrated to be wrong in his surgical practice. But he was quick to seize upon selections in which these British surgeons contradicted themselves and supported Mr. Thomas' own views—as they often did. For example, Mr. Thomas quotes:

> The Fakirs of India have joints, which are stiff from prolonged disuse, and, so long as they have no desire to use them, the joints remain stiff, but, as soon as the time of the devotee's vow has expired, the function of the joints is gradually restored by use, though the immobility had, through the vow, been maintained for a period of twenty years. [20]
>
> A man, whose skeleton is at Marburg, was encased by his relatives for twenty years in a space in which he could only sit with his limbs doubled-up, and in which he could have had only very narrowly restrained movements of his joints; yet his limbs did not become deformed, and his joints retained their normal textures. And many a case of hysterical joint, after being contracted for years, has recovered without any error of shape.[21]

All of which was to call attention to the point that nearly all the surgeons of his time had been wrong, who had been warning against the dangers of immobili-

[20] LITTLE: *Anchylosis and Stiff Joints,* 1843, page 31.
[21] PAGET, SIR JAMES: *Lectures and Essays,* 1879, page 213.

zation and rest. It does seem strange that we still have in nearly all of our textbooks and lectures, the same misapprehension that immobilization causes inflammation, interference with circulation, and ankylosis. All of these being entirely dependent upon pathology, *not rest.*

Mr. Thomas did not hesitate to call attention to the fact that Dr. Hilton failed to provide rest for his patients with diseased joints. (Perhaps for failure to use a Thomas splint!) Thomas says:

Here is another example of erroneous practice based upon false principles, by an advocate of rest for joint disease.

The wrists and elbow-joints can be surrounded by splints, so as to secure absolute local rest while the patient moves about.

This error of practice was made by the great British apostle of "surgical rest," John Hilton. At page 447 of his volume on *Rest and Pain,* Second Edition (1879), there is to be found the description of his practice in treating a case of chronic disease of knee, with such an amount of tendency to a progression of the disease, that it passed into the suppurative stage.

Steady pressure upon the joint, by strapping it with soap plaster, and perfect rest to the joint by the splint. (Here we have the "soap plaster" acting for an evil, but the splint for a good purpose.)

This was Dr. Hilton's practice, in treating a joint which ultimately suppurated; subjoined in his report: "There was obviously defined fluctuation above the knee, as well as in the popliteal region."

From the above we may fairly conclude that he employed the "direct method" indiscriminately, as the majority of surgeons do now; consequently, he had not grasped the true meaning of "rest" in its surgical significance.

J. P. David's memoir, *Motion and Rest in Relation to Surgery,* which was awarded the prize for the year 1778, by the Royal Academy of Surgery of Paris, contains, as regards the treatment of articular disease, all the theoretical views taught by Hilton and laid down with equal confidence; but a perusal of M. David's essay on *Counter Strokes* informs us that in prac-

tice he also vitiated his remedy by employing the direct method indiscriminately.

If the latest published monograph on the subject of disease of the joints, is consulted, the same error of practice will be found.

In it, articulations in a state of chronic disease are advised to be treated by the direct method, for example:

At the earliest moment at which disease is detected, the joint should be enclosed in a pair of well fitting rectangular splints.[22]

These errors by the famous author of *Rest and Pain* (1863) and *Motion and Rest* (1779) have persisted to an astonishing extent in surgical practice.

Our three great leaders in this campaign for the prevention of motion in fractures and joint disease have still not been heard nor heeded by a large majority of our "learned" profession.

The errors of David and Hilton, and of the New York leaders of the "American School" are still being committed by surgeons everywhere.

Surgeons being as human as they are fail to immobilize injured and inflamed parts before, during, and after surgical procedures simply from "want of thought." In that way much "evil is wrought."

For faulty diagnoses, failure to recognize indications for splints, and injudicious manipulations in fractures and joint disease we must hold members of the "regular faculty" more to blame than the "sectarians." [23]

But it is difficult to excuse, as Thomas found it difficult to explain David and Hilton, those who employ therapeutic devices that disregard or violate the principle of rest. For the disturbance of parts by applica-

[22] THOMAS, H. O.: *Fractures, Dislocations, Deformities, and Disease of the Lower Extremities,* 1883, pages 165-166.

[23] Mr. McMurray reemphasizes this point in his lecture on *The Thomas Splint,* 1946.

tions, wound dressings, alterations in or removal of apparatus and all the other nerve, muscle and joint damage that are done in the name of chemo-, physio-, mechano-, or even surgical therapy, Thomas, Jones, and Ridlon—especially Thomas—would have the answers—in fact, the answers are in the *Contributions* already.

There is a final word that should be added regarding the advocates in the time of Thomas (like Hilton) and ever since, of "ambulatory treatment." As Thomas indicated, even elbows and wrists cannot be given "absolute local rest while the patient moves about." To pretend to control motion of the fragments and prevent muscle spasm in any *ambulatory* patient with a fracture or joint disease of the lower extremity is professional care "under false pretenses."

One of the most interesting and enlightening chapters in the career of Hugh Owen Thomas was that which had to do with his acceptance, and then rejection, of the Lister antiseptic method. This is thoroughly discussed in his chapter on "Relief of articular distention by aspiration and incision (1876)." Mr. Thomas called attention to those cases of suppurative disease of the knee joint, in which the resources of the immobilization and aspiration method have been exhausted and drainage is necessary. Mr. Thomas had previously employed the "open method" relying chiefly upon wide drainage of septic cavities, simple, mildly antiseptic and absorbent dressings, along lines similar to those used with great success in compound fractures and amputations at about the same time by Dr. F. S. Dennis of New York. Mr. Thomas tried and said that he admired the antiseptic method, and that it seemed to him to be only the old open method made safer and

harmless. Thomas said that if Professor Lister's ability had been extended to perfecting an open method, we should have now been in possession of a method more simple, easy, and safe, than the antiseptic, great as its merits are.[24]

It should be remembered that at the time of Mr. Thomas' writing, the Lister method consisted of *an elaborate ritual* as Mr. Thomas suggests. There were the washings and soakings, including the hands in high percentages of carbolic acid solution. There was a carbolic acid spray during the operative procedure, and the carbolic acid dressings, frequently changed after the operation. Moreover, there were complications as to the closed wound, in some cases in which the antiseptic procedure was not entirely successful. It was to this failure to eliminate infection, and the suppurative and septic complications following, to which Mr. Thomas took exception. Accordingly after three years, he abandoned the Lister antiseptic method in favor of the open method in which he did surgical procedures with careful washings and irrigations, with a thorough operation that amounted almost to the debridement as we now understand it, and with wounds kept open by means of oil dressings, so as to prevent closure until a suppurative discharge had been discontinued. In this way, Mr. Thomas certainly obtained a degree of cleanliness, a kind of drainage, and a character of results, superior to many that were being obtained by the so-called Lister antiseptic method as then (and since) employed.

It must also be recognized that many modifications, perhaps including some by Mr. Thomas himself, of the Lister program had been introduced. Certainly in many

[24] I hope I may be pardoned if I say that, it was to this exactly, that I referred in 1937. (H.W.O.)

clinics less than the Lister standards of antisepsis and cleanliness had been attained, and certainly in many hospitals, wounds were being closed, and post-operative dressings were being done with serious violations of the Lister ideals, and the Lister technic. Even so, the principal factor in the Thomas program, and one overlooked even by Lister and his associates, was "rest" by pre-operative and post-operative immobilization of the injured and diseased parts. It has been this factor to which we have been trying to call particular attention in recent years. The provision on the part of Mr. Thomas *for rest and physiologic function*, must be considered to have been a major factor in the excellent results he obtained. Anyone who reads the account of his cases must be impressed with the conscientious consistency with which these features of the Thomas program were constantly carried out.

CHAPTER III

Methods of Securing Rest in Fractures and in Articular Disease

AS I HAVE indicated previously, Dr. Ridlon made several attempts to write a book on Thomas, and in his later years tried to write a biography of his own. Dr. Ridlon, on his own account, and influenced somewhat perhaps by Hugh Owen Thomas, was a severe critic of many of his predecessors and his competitors. About the practice of his antecedents Dr. Ridlon did not inform himself as fully as Thomas, but about his contemporaries, he knew practically everything. Dr. Ridlon has referred in my letter from him of April 7, 1932, to some sketches he wrote for Frederick Watson of *The Crippled Child*. After a series of twelve or so, Frederick Watson asked him to discontinue because he was making comments about so many of the contemporary orthopedic men not suitable for publication. Dr. Ridlon's respect and regard for Thomas, and for Robert Jones, were so high that almost everyone else suffered by comparison. Moreover, Dr. Ridlon had the same regard for the observation of fundamentals in practice and the same impatience with their neglect that Thomas and Sir Robert Jones always had.

When, therefore, his contemporaries disregarded fundamentals, either in their surgical operations, in their application of apparatus, or in their conduct toward patients, Ridlon spoke out, and said what he thought about the discrepancies that he observed. Dr. Ridlon was also always righteously indignant over misrepresentations regarding cases or results.

Speaking of his associates in Chicago, Dr. Ridlon made a characteristic summary of their achievements. He said that John B. Murphy "ranked high on all sides, a learned surgeon, a great teacher, and a competent operator." Nicholas Senn was "a big man as a writer, as a teacher, and as an operator, but small otherwise." Christian Fenger, he said, "was the most learned surgeon he ever knew, a poor operator, and a poor teacher, but the most honest and upright of them all." Dr. Ridlon was equally frank, favorably sometimes, but often otherwise, about his orthopedic colleagues.

At the time when Dr. Ridlon was planning a book on Thomas, he intended to devote the book to a discussion of Thomas' principles in treatment, and especially to the details of technic, by which he carried out those principles in practice. Doctor Ridlon intended, however, to omit a discussion of the book, *Intestinal Obstruction.* (See my letter of November 10, 1930, in the Ridlon Scrap Book). It seems to us that every surgeon, and even every orthopedic surgeon, should read Thomas' book *Intestinal Obstruction,* not only because it sheds so much light upon the principle of physiologic rest, but because from that book more than any other, one gains an insight into Thomas' character, and his devotion to the clinical or bedside care of his patients. To anyone who has been a general practitioner of medicine or a general surgeon in the best

sense of the word, the care of the patient at home or in the hospital ward is always of fundamental importance. Dr. Abraham Flexner in his book *Medical Education* calls attention to what he calls "the science of the bedside," and emphasizes its importance as compared with the science of the laboratory. Thomas makes clear in his book on *Intestinal Obstruction* not only how important it is to make a careful pre-operative study of every patient, but that the post-operative care, until the patient is really well, should be an essential part of the program in dealing with every case. Moreover, Thomas calls attention to the fact that while much of his work had to do with the care of fractures, the principles involved in the care of patients with intestinal obstruction, and those with compound fractures are really the same, and should always be observed in the same way, and with the same expectation of good results.

From the point of view of the clinician and the pathologist as well as from the historical standpoint Thomas was, and still is, much more logical than most in arriving at his methods of treatment. That is the principal reason why his arguments and conclusions, even after somewhat violent debate, have not only "stood up" but have become more effective with the lapse of time.

In Thomas' approach to the methods of securing rest for joints and fractures he begins properly with the establishment of a very definite basis (without the x-ray) in clinical diagnosis. He says:

> It will probably make my argument more easily understood, if I define what I mean by such terms, as *"healthy joint," "inflamed or diseased or unsound joint," "anchylosed inflamed or diseased or unsound joint," "anchylosed sound joint," "sound joint," "deformed joint, or avoidable practical defect."*

The following paragraphs, and others in Chapters IV and V, are quoted at considerable length, directly from Thomas, in order to get the Thomas influence that I feel can hardly be obtained in any other way. As indicated previously, Thomas' disposition for detail makes him somewhat less than perfectly clear at times, regarding his methods and regarding the construction of his special splints and apparatus. At such portions of his writing however, it is worthwhile to re-read or work them out, both for the clear insight it gives us into Thomas' personal and professional character, and for the influence upon our own work of methods in regard to which some of us have become less careful regarding details than we should be.

I have suggested at several points in this book that not only the prescription, but the application of braces, is the business of the surgeon himself. He is the only one who knows exactly what he is trying to accomplish for the patient, and the only one who knows when the therapeutic methods and devices employed, are working in the right direction, or when they have obtained the desired results. I have been very impatient at times with the condition of certain patients well advanced in treatment, but who have failed to obtain satisfactory results because the after-care had been left too largely to brace makers, shoe salesmen, or shoemakers who, of course, had an inadequate idea or no idea at all, of the patient's original condition, the kind of care necessary, or the results to which he might be entitled if the complete, proper program of care had been successfully carried out. It is desirable then, to read the following to indicate Thomas' ideals as to the diagnosis of joint conditions and therapy. Thomas has been criticized for being a poor pathologist, but if the following para-

graphs from Thomas' own writings are well understood, it will be seen that he had an unusual clinical understanding, not only of the symptoms, but of the underlying pathology in the joint conditions discussed.

A *healthy joint* is one, the radius of action of which is equal to the radius of a similar joint in the majority of people, though not equal to the radius of some exceptional examples. Again, it is one that has never been the subject of inflammation, and is fitted for the daily weight and friction attendant upon use, provided that it has the usual interval of repose; this interval being necessary, otherwise inflammation would arise from over use, as we know this mishap to be not an uncommon interruption during attempts at task pedestrianism.[1]

An *inflamed joint* is an articulation, the radius of action of which, in the absence of the practice of more or less immobility, is gradually diminishing. This diminished radius of action, being usually and correctly designated joint-deformity, tends to increase so long as the joint is unsound, and is caused solely by the efforts of nature to practice immobility as a means towards aiding resolution. An inflamed joint may or may not be accompanied by effusion of liquid matter within the capsule, according to the circumstances influencing the joint lesion.[2]

It should be observed, much to Thomas' credit I think, that these comments were recorded in the early days of the Listerian revolution in surgery—and before any real distinctions had been made between acute and chronic infections and other kinds of inflammation. Also Thomas' explanation of "fixation" by natural responses to inflammation, irritation by exhaustion, ligamentous contractures, swelling or muscle spasm as defensive measures led him, as it should much more often

[1] Mr. Thomas did not attempt those fine distinctions of "Strain," "Muscle Spasm," "Myofascitis," and "Allergic Synovitis" that often confuse us now.

[2] Thomas, H. O.: *Principles of the Treatment of Diseased Joints*, pages 2-4.

lead all of us, to correct clinical conclusions regarding treatment.

In recent years we have been wandering in a fog of pathological, bacteriological, radiological, chemotherapeutic reports and recommendations so dense that we often fail to find the splint the patient needed after our first five minute examination.

Thomas continues as to diagnosis:

Anchylosed inflamed or unsound joint is an articulation in which some signs of inflammation remain, and where there can be no motion detected. This evident absence of motion at the articulation may arise from the want of pliability of the capsule and its surroundings; or there may be osseous adhesions between the bones comprising the joint, but in an unsound anchylosis, progressive and evident motion will follow use, if the limb, in which the anchylosis exist, is employed for its usual purpose. For instance, if at the commencement of use it be in a practical position, use will cause it to recede from this; or should it be an impractical or defective position, this defect will be increased, no matter what may be the nature of the anchylosis. This fact justifies me in classing all forms of unsound anchylosis as "false anchylosis."

The point to which Thomas directs our attention here, is that in any diseased limb, with an unsound or false ankylosis at the joint, the deformity will be progressive and the tendency, as far as the disease is concerned, will be to become worse. It is, therefore, as he points out later, of the greatest importance to protect such an extremity by a suitable and efficient splint, both to bring about arrest of the disease, and to protect the extremity with the joint in a "practical" or useful position for subsequent function. This is important whether the patient recovers with a movable joint, or with a useful limb, in which an ankylosis of the true (bony) variety supervenes. At another place, Mr.

Thomas calls attention to the important point that during periods of unsoundness it is easier to alter the position, or the line and length of a limb, and so bring about, even in the presence of disease, a less deformed and more useful position of the part as a whole for ultimate function. We have often failed to take advantage of this point, both in joint disease and in fractures, because we have been apprehensive about the danger of stirring up local infection, or of causing metastasis of infection from the primary focus of infection to other portions of the body. Mr. Thomas, in his writings, mentions several times that dangers of this kind can be avoided by suitable pre-operative and post-operative immobilization in correct position.

It has been one of the features of the plaster-of-Paris cast, infrequent dressing program, that I have been advocating for many years,[3] that, when necessary or advisable to revise the position, even of a compound fracture, it is done along the lines Mr. Thomas advised. That is to say, the limb should be immobilized on the operating table; revision of position should be carried out with a minimum of trauma, and with post-operative fixation by means of skeletal pins and plaster-of-Paris so efficient that muscle spasm, movement by the patient himself, and especially disturbance by dressings, irrigation, or changes of casts, or apparatus, can be avoided. In this way the patient can resist infection, and promote healing, with the best circulation, nerve supply, and other physiologic functions possible, in view of the amount of damage or injury sustained originally.

The principle of open drainage in the presence of infection, restoration of the original parts to correct

[3] See beginning of Chapter II.

anatomic relationship, protection of the wound against secondary infection, and immobilization and rest in correct position during healing, all exactly as Thomas instructed us originally, are the fundamentals of such a program. These advantages every patient should have, for restoration of "soundness," whether in a joint or in a fractured limb, in this way there will be a reduction to a minimum of deformity and disability, and the best chance for recovery as far as the inflammation and infection are concerned.

Mr. Thomas continues:

Anchylosed but sound articulation is one, the nature of such anchylosis being immaterial, as no trace of inflammation remains; then whether the anchylosis be accompanied by practical avoidable defect (deformity) or not, ordinary daily use cannot bring on any variation of position, an indication that such condition of anchylosis ought to be termed "true anchylosis."

Sound joint is one, from which all traces of previous inflammation have passed away. In evidence of this sound condition and complete recovery there may be noticed, that by ordinary daily use, the radius of action, to and from the position maintained during treatment, is seen to be gradually increasing, no matter in what position the limb may have been fixed during treatment—an infallible sign of soundness and a justification for no further restraint or surgical interference.

Deformed joint. Deformity of an articulation depends upon the locality. Any amount of flexion—if permanent—at the knee-joint constitutes a deformity at the elbow-joint. This apparent inconsistence of classification is justified on the ground of expedience and the necessity of securing, during treatment, a posture which will ultimately give the utmost practical use, in case the motion of the articulation should be lost from inflammation, should the inflammation not be sufficiently moderate in degree, nor sufficiently shortened in duration by the exercise of the highest art, so as to avoid anchylosis.[4]

[4] THOMAS, H. O.: *Principles of the Treatment of Diseased Joints*, pages 2-4.

One of the points emphasized by Mr. Thomas in different ways is that it is the surgeon's duty to know all the ways in which Nature endeavours to relieve and cure disease. If these natural measures are known, then it is easier for the surgeon to make use of all the natural agencies, and equally not to interfere with the patient's own defences and efforts at repair. In his own words:

> If any person, with a part diseased, possesses sufficient vitality so that there be a tendency to reparation in the diseased locality, then Nature always has a mode of operation, and in very many instances the natural method of restoration has become known to us. Indeed the practice of medicine and surgery mainly consists of either aiding or controlling or supplementing this natural effort at resolution, and in these instances where, from experience and knowledge, the method of Nature has been changed, the mode not the principle has been supplanted.[5]

In this same connection Mr. Thomas directs our attention to the danger that those who are unfamiliar with the principles that must be understood or with techniques for putting diseased parts at rest will resort to therapeutic methods not suitable to contribute to recovery or even harmful to the patient. He is thus particularly concerned about the application of radical methods like joint resection or amputation in joint disease when "rest" in its proper form has not been employed or perhaps not even thought of. He says:

> My own conviction is this, that some of those cases of articular disease, which treatment cannot cure, and which terminate fatally in most instances, might have been saved by amputation; or by excision, but then in order to have a chance of success the operation must be performed early, and to do so is only to return to the practice of twenty years ago and excise all

[5] Ibid., page 7.

round, mutilating all to save the few. Time tries all things. That amputation at times and excision at other times will have to be resorted to, is probable, but the most successful result from excision is only equal to the most defective but sound useful limb that has been subject to modern treatment. Even now, surgical opinion is undergoing a change in the direction of my own teaching, which proves that my forecast of the place excision is to occupy in the surgery of articular disease was correct, and not far from becoming generally accepted.[6]

In other words, to speak of amputation "when necessary" or "as a last resort" should mean that a correct diagnosis of joint disease was made early and immobilization as carefully tried as an expert like Mr. Thomas knew how to use it.

If not, then a radical operation became not "a last resort" but a refuge for a patient and his surgeon after failure to provide either early recognition of the situation or correct treatment in the early stages of the disease.

Those who find fault with Mr. Thomas for his deficiencies as a pathologist are usually also critical because he is repetitious in the matter of case findings and clinical conclusions. But such observations and records become very convincing—even if occasionally dull—as to the value of proper "rest" and as to the safety and efficiency of conservative rather than radical operative methods.

The reader will have noticed that most of the arguments advanced in this volume, are grounded upon certain very obvious deformities attendant upon the disease of special joints. This restriction I have purposely adhered to, as the deformities here discussed are generally admitted to happen. I have reserved the discussion of those deformities attendant on the disease of the other articulations, and which are difficult of demonstration, for

[6] Ibid., pages 149-150.

the succeeding volume, which will be devoted to the practical application of the principles of treating articular disease in general.[7]

He thinks that more and different case reports are necessary but they all must—in Thomas' view—and do, conform to the requirements he has set up for a correct estimate of the diagnosis, and for an apparatus that corrects or prevents deformity and provides "rest."

Now he describes the "machines" or "irons" or "splints" to which he has devoted so much thought, labor, and expense. His methods and shop have been described in detail by McMurray, Aitken and others (see Chapter VIII), but his motives as a mechanotherapist no less than his regard for the patient must also have our respect. With regard to one device for amputation cases, he says:

> We are living in the era of labour saving machinery. The surgical appliances described in this volume, I believe come under the class of "labour saving." All fractures and articular ailments are not curable; amputations are, as yet, in some rare instances indispensable operations. The reader is referred to a frame found by me to be "labour saving" in the after-treatment of amputations at or above the knee joint. It is constructed of five-sixteenths-inch iron wire, the angle of repose is easily varied by straining apart, or closing, its wings. Its wide lower wings cover a large area, and do not sink into a soft bed, and on them a weight can be placed to anchor and keep steady the stump.[8]

There seems to have been no general use of traction as a part of the post-operative care in amputations, until World War I. At that time, rather elaborate

[7] Ibid., page 151.

[8] THOMAS, H. O.: *Fractures, Dislocations, Deformities, and Diseases of the Lower Extremities,* page 97. (Contrary to some of Thomas' other teaching, this is an immobilization device dependent upon traction.)

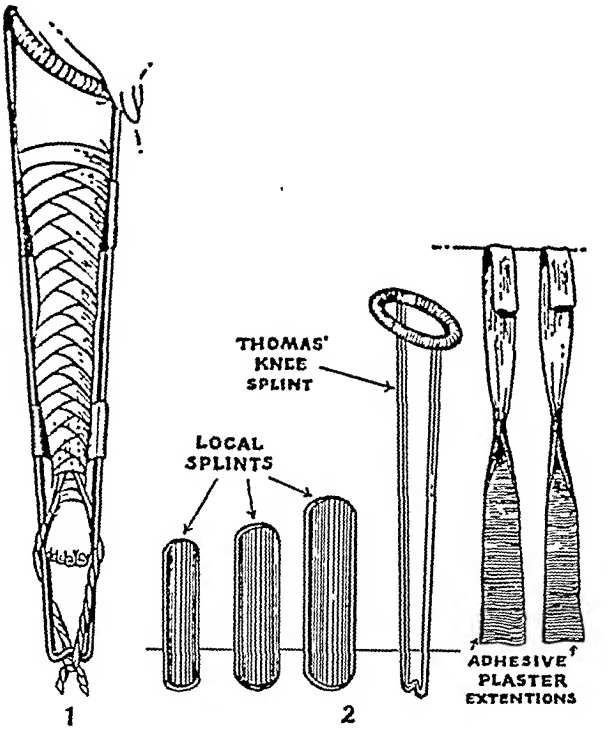


Fig. IV. (1) Thomas splint in correct position before applying the posterior and side splints. (2) Essential requirements for the treatment of fractured femur by Thomas' method. (From McMurray, T. P.: Thomas and His Splint, *British Medical Journal,* 1:872, 1946.)

devices were worked out, by Maurice Sinclair and others for the British, and by Philip Wilson and his associates for the Americans, to provide good traction for both leg and thigh amputations. This was designed to prevent retraction and strain upon the stump, whether a careful plastic amputation had been done, or whether a guillotine operation had been performed.

In any case, efficient traction and immobilization, whether in a ring adhesive plaster device in a Thomas

splint, or by means of a plaster-of-Paris bucket fastened to the skin, had the effect of preventing retraction of skin, muscle, and other soft structures at the end of the stump. Such traction and immobilization also prevented flexion deformity, especially at the knee and hip, following amputations. This plan served also to obtain the earliest possible healthy stump, free from swelling, and ready for the temporary pylon of plaster and other materials, that were used both by the British and Americans in many of their amputation cases. All of this dates back really to the suggestion of Thomas in the preceding paragraph.

With regard to his famous "ring caliper knee splint" (World War I) he has the following to say (in part):

It obviously follows that if the conditions maintained by me, as favoring or hindering the reduction of deformity, be facts, then the amount of deformity is no guide to the degree of force or time that may be required to be expended in reduction; it being mainly a question of the quality of the structures; so that a very unsound joint, though greatly deformed, is much easier corrected than one far advanced to, or that has actually recovered, with a small degree of deformity. Having reduced the deformity of flexion, the surgeon, may even then find occasionally, both in youths and adult life, that he has another deformity remaining, either a posterior luxation of the tibia or a "knock-knee." As regards the tibial luxation, it is my practice never to give this deformity any attention, it is only a deviation from symmetry, not from the limb's utility. It is a prevalent error of opinion among us, to suppose that the reduction of the fixed flexion of the knee sometimes causes tibial luxation, this is not my opinion: it is forgotten, that an already formed moderate degree of tibial luxation is not perceptible when the knee is much flexed, becoming noticeable only after the correction of flexion. As regards the "knock-knee" complication, we know this to be like a "bent reed," a source of weakness and shortening, and if we trouble to reduce the shortening attendant

upon flexion, then that which may follow, genu valgum, equally needs our attention.[9]

Efficiently applied, the Calliper splint is a splendid inhibitor of the prominent symptoms, constitutional, and local, felt and observed in connection with progressive diseases of the knee-joint. Presupposing having applied the instrument, it is worn almost uninterruptedly until recovery; *it is my practice to change the sock only about once every two or three months, sometimes it remains on the foot even longer; further, this temporary interference is always personally superintended by me;* (The italics are ours. H.W.O.) the patient's boot being always slit open to the toe, enables us to drop it posteriorly attached to the Calliper, to change the sock without disturbing the cross-leathers; once these have been drawn across the rods and firmly stitched in their place, it is of great importance that they are seldom, or if possible never varied, otherwise the form of the joint must also vary; an injury best guarded against, by watching and repairing the stitching of the cross-leathers when beginning to "give way." [10]

The use of a caliper splint with anything like this degree of efficiency, is practically unknown at the present time. Immobilization of tuberculous knees in plaster-of-Paris, sometimes accomplishes more or less what Thomas had in mind. Generally speaking however, even with plaster-of-Paris casts as applied in general practice (not by specialists) the immobilization is for a shorter period, and with a cast that fits so imperfectly the knee is still inadequately immobilized. It was a matter of considerable concern to many of us during World War I, that caliper splints, with badly fitting rings, imperfectly applied otherwise, and with much less than efficient immobilization were constantly employed. They were used for both femur and leg fractures, and even for fractures involving the knee

[9] Ibid., pages 181-182.
[10] Ibid., page 189.

joint in a manner that left much to be desired from the standpoint of protecting the patient against movement, muscle spasm, and deformity.

These comments are directed particularly at all those surgeons who have devised, recommended or exploited "gadgets" for fractures, extremity inflammations, and joint disease. Most of these devices cannot, under the most favorable conditions, and with constant care, even approximate the ideals set up by Thomas seventy-five years ago.

If a caliper or any other kind of lower extremity splint is to be employed, some such degree of efficiency as suggested by Mr. Thomas is certainly the ideal to be attained. Anything less, is a violation of the fundamental principle of rest, so important for such a diseased or injured extremity.

My impressions with regard to defects in splinting in general were stated rather definitely in an address in 1920. And I am rather more confirmed in these views after a long and similar experience in civilian practice (not to mention observations in World War II) since that time. I said in part:

> Our military experience proved to us that it is possible to reduce to more or less accurate figures the results of medical service. It was demonstrated in figures that certain hospitals, certain commanding officers, certain chiefs of services, and certain ward surgeons and ward medical officers did better work than others.
>
> In my first paper before this association twenty years ago, [in 1900!] I argued that better standing for the medical profession could only come through taking our patients more completely into our confidence on professional matters. They came into our confidence without asking during the war. They watched us operate upon, splint, and treat our patients. Moreover, they stood by and observed our results. Officers and en-

listed men knew whether or not fractures were uniting properly, whether or not wounds were healing, and whether or not supposedly clean surgical procedures were followed by infection, and more often than not, they could tell why.

Having been elected to the Presidency of this (Nebraska State Medical) Association with a very strong military plank in my platform, I am taking the liberty of bringing to you one of my own principal lessons from the war. I am speaking frankly of a few things not often considered in connection with the service of the medical corps.

My duty at Savenay was to check upon all patients as to condition on arrival from other hospitals and to direct such treatment, operations and splinting as might be required to render them fit for evacuation to the United States. In this way it was my privilege to see most of the Americans seriously wounded from August, 1918 to March, 1919.

Of the 4,000 orthopedic patients arriving in Savenay during August and September, 1918, about two thousand fell into the classes designated above as three and four. That is, those in class three required revision of position and change of splint. Those in class four required splints, but had none. There were about one thousand falling into each of these classes.

It was interesting to notice that there were certain fractures which were well splinted and certain others which were not. It is not very much to our credit to say that in general only the easier splinting was done. That which called for special apparatus or special work was often neglected. Gunshot fractures of the shoulder were poorly splinted. About three-fourths of 72 of these patients had no splints whatever. Aeroplane splints were hard to get. We ourselves made nearly all such splints used at Savenay. Fractures of the humerus were splinted better. Almost every hospital had the Jones humerus traction splints for these cases. In all we had 156 cases of which 55 had no splints.

Gunshot fractures of the elbow joint were poorly splinted. One-third of sixty-one cases had no splints. Gunshot injuries of the forearm and hand were poorly splinted. In all, during August and September we received 360 of these cases, 120 of which had no splints. Practically all of the other patients in this class came to us in straight Thomas arm splints with fore-

arms pronated. These positions usually had to be revised, elbows bent and forearms partly supinated. This was sometimes a difficult procedure.

Gunshot wounds of the nerves without fracture were poorly splinted. At least one-third of the gunshot wounds of the musculo-spiral nerve with drop wrist had no splints. Most of the remainder had straight board splints. The splint manuals taught us that these cases should have been wearing cock up splints.

Femurs were well splinted. Of 140 cases, only twenty were without splints. While the remainder all had to be revised, these were splints which easily became disarranged during transportation. Generous allowance had to be made on this account.

It was interesting to note how poorly injured knees were splinted. I still feel that this was due to a too enthusiastic popularization of the idea that septic joints may be kept moving. Out of 90 of these cases, fifty were received with no splint. Many patients were suffering from lack of them. The same was true of injury to the sciatic or external popliteal nerve. Of 72 such cases with drop foot, 50 had no splint, many had never had a splint.

In leg fractures there was an astonishing number of deformities without splints. This was due largely to the difficulty of splinting compound fractures of the leg. By the same token, however, these same cases were suffering particularly from lack of splints. There were 192 such cases of which 69 had no splint.

Compound wounds of the foot and ankle were also poorly splinted. This was particularly unfortunate inasmuch as many of these patients were developing drop foot with fixed deformity. This is a point that is often overlooked in civil practice. There were 240 of these cases, of whom 129 had no splints.

In wounds of the soft parts without fracture, the importance of splinting was also frequently overlooked. Gunshot wounds of the upper and lower extremities, without fracture but with developed or developing deformity, numbered 265 cases. Of these 134 were without splints.

I feel compelled to say to you, that surgeons in general (not general surgeons, particularly) whether in France or here, have

not been receptive enough in these matters. We had gained all too little out of this war.[11]

The above extensive quotation from my address of 1920 indicates how completely under the influence of Thomas, Ridlon, and Jones I was at that time. As a practical result of the military experience and a review of the teachings of Thomas, Jones, and Ridlon I had already begun the infrequent dressing—plaster-of-Paris method that has now almost entirely displaced all antiseptic, irrigation, and frequent dressing wound treatment. Some of the good results obtained in wounds and compound fractures during the past twenty years have been attributed to maggots, sulfa drugs, and penicillin or to debridement, primary and secondary closure and to other special techniques. But it will usually be observed, as Trueta and others have shown, that the more nearly my program of 1923 is followed otherwise, the better the results are likely to be. It is of interest that the paper from which the following quotations are made was refused publication in the *Journal* but was printed in the *Transactions*.

This treatment rests on several general propositions:

First: In most bone infections the patient begins with an infection by a single organism. This becomes a mixed infection as a result of the commonly employed methods of treatment.

Second: In ordinary practice the fundamental surgical principles of aseptic operation and dressings, wound protection and rest for the affected part (by proper splinting) have been disregarded in order to carry out methods of so-called "chemical sterilization."

Third: In the mixed infections that follow such methods,

[11] ORR, H. W.: *The Rights of the Patient,* (Address of the President before the Nebraska State Medical Association, Omaha, Nebraska, May 24-26, 1920.) Nebraska State Medical Journal, July, 1920.

healing is very much delayed or not obtained at all, and deformity and disability of the affected part are the rule.

Fourth: Healing of such conditions, when obtained in the past, has usually come about in such a way as to suggest that it is the result of the patient's having evacuated his infected area and having overcome his infection; rather than to the operation, irrigation, dressings, etc., that were employed.

Fifth: A patient who survives any acute infection may be assumed to have developed a certain measure of self protection (immunization) which he can use toward recovery if he is not overwhelmed by the existing or by added (mixed) infection.

Sixth: The points to be observed in treatment would therefore appear to be: (a) drainage; (b) removal of dead tissue; (c) protection of the infected area against reinfection or mixed infection; (d) to place the patient in such a position and under such conditions as will enable him to make the most efficient natural resistance to his infection, and (e) to have the patient recover with all the affected parts and other parts in the vicinity in such relation to each other as will make for avoidance of deformity, a minimum of disability, and therefore the best possible function.

The exact technic to be employed in any case is as follows:

1. Make a fairly large incision over the infected bone area. Spread apart the skin, muscles, fasciae and periosteum just far enough to afford access to the diseased area and no farther.

2. Now chisel a window into the affected bone area large enough so that all diseased bone may be removed and so that there are no overhanging edges of bone over the diseased area.

3. Clean out the diseased area gently with a curet or gouge, being careful to damage tissues undergoing repair as little as possible.

4. Dry the wound and wipe out with ten per cent iodin followed by ninety-five per cent alcohol.

5. Pack the entire wound wide open but not tightly with a sterile petrolatum gauze pack. Cover this with a dry sterile pad and bandage on.

6. Now perform any reasonable forcible manipulation necessary to place the parts in correct anatomic position for splinting (abduct the arm to ninety degrees in humerus cases; dorsiflex and supinate the hand in forearm and wrist cases; dorsiflex the foot to a right angle with the leg in leg and foot cases, etc.).

7. Apply a plaster cast (preferably) or a suitable splint so that the parts are thoroughly immobilized in comfortable and correct position. (Additional weight and pulley traction, Balkan frame, or even ice tongs or bone pins may be used especially in those infected bone lesions associated with fractures and old fracture deformities which are being corrected at the same time as the clean up operation). It is in the latter cases that some of the most gratifying results may be obtained by this method.

8. Finally, the cast is not to be split nor are windows to be cut in the cast until wound dressing becomes necessary. And *the wound is not* to be dressed at all except for rise of temperature or other signs of acute sepsis.

One of the points to be emphasized in regard to this treatment is that it calls for the close personal attention of the responsible surgeon himself. The original operation and the secondary dressings by this method can and should be done either by, or under the eye of, the surgeon in whose hands the patient has placed himself.[12]

The application of Thomas' methods to obtain rest for injured extremities and even for intraperitoneal inflammations is wider now than at any time since 1876. If our opportunities for inspection of the practice of civilian surgeons could be the same as those we had in 1917-1919 we should find defects in the splint care of fractures and joint disease just as Thomas did in 1876, and as we did in the military practice of 1918. We did make a study in Lincoln, Nebraska, of thirteen hundred fractures treated by ninety-one members of the "regular faculty" from 1929 to 1935, but publication of the report (read at a medical meeting) involved implied criticism of so many of our contemporaries that it was never published!

[12] ORR, H. W.: *A New Method of Treatment for Infections of Bone.* Reprinted from *Transactions of Section on Orthopedic Surgery of the American Medical Association,* 1923.

CHAPTER IV

Diagnosis and Treatment of Hip Disease

IN THE 1880's orthopedic surgeons and even many general surgeons were much preoccupied with necrosis, mollities ossium, tumor albus, scrofula and other forms of bone and joint disease. Although traction and rest were under discussion, then as now, treatment for knee and hip joint disease, weights and pulleys and Davis, Sayre, Taylor and other splints, and especially resections and amputations had proved unsatisfactory from the standpoint of results. Also, as at present, "rest" in the treatment of joint disease meant one thing to most surgeons, but something quite definite and different to Hugh Owen Thomas of Liverpool. One of Dr. Ridlon's early and important formal articles, after his return from Liverpool in 1887, was, therefore, an article on hip joint disease. This was published in Volume 1, Number 4, of the *International Journal of Surgery and Antiseptics* in October, 1888. His article was called *Double Hip Disease, a Report of Fourteen Consecutive Cases, with Conclusions.*

Dr. Ridlon, himself, had learned the use of, and demonstrated to his own complete satisfaction the value

of the Thomas splint in such cases. Among other things, he called attention to the fact that freedom from pain had been gained in all cases by rest in bed, and weight and pulley traction. Some of these patients, however, under care for several years, in spite of relief from pain in the hip and knee and improvement in general health, had developed adduction, flexion, or other deformity. He noted, therefore, that for deformities not prevented or relieved by weight and pulley traction, the double hip splint of Hugh Owen Thomas served the better purpose. One of his points was that when the patient recovered in the Thomas splint even with ankylosis the limb might be short, but that apparent shortening was less and deformity more positively and definitely prevented. Dr. Ridlon, like the wise surgeon he was, adhered to the other important elements of treatment, namely rest in bed, aspiration or incision when necessary, exposure of the patient to fresh air and sunlight, and the like. This, he said, can be done better and more safely in the Thomas splint, and particularly with greater comfort for the patient. This was one of the first, and most important arguments in this country for the use of the Thomas splint. It was conclusive for some, even at that early day, but weight and pulley traction has continued to be employed by others up to the present time.

Dr. Ridlon had been advocating immobilization and better protection for diseased joints for a long time before he published his book with Robert Jones (in 1899). As a culmination more or less of his New York period, he published the *Review of 62 Cases,* New York Medical Journal, Oct. 3, 1890, upon his return from his second visit to Liverpool. Although he had found some defects in the actual care of patients in Mr. Thomas'

busy practice, he was fully confirmed in his belief as to the efficiency of the Thomas methods and apparatus. With them it was possible to obtain better results for patients with joint disease and fractures. He had good reason to be dissatisfied with the former "American Method" by which "traction with motion" had been the guiding motive in practice and in making orthopedic appliances.

In fact in one of his papers (New York Medical Journal, Feb. 5, 1890) he had already spoken of the death of the old "American Method" and the advent of the new—"We believe in fixation first, last and all the time." This was the Thomas method.

After more than ten years of the Thomas splints and methods Dr. Ridlon had become more fully convinced of the value of immobilization and persuaded as to the Thomas techniques for securing "rest." Dr. Ridlon stated:

> Traction is not essential to the successful treatment of the majority of diseased hips. All that is necessary may be obtained by the use of an apparatus of simple construction, of slight cost, easy of application, not readily misplaced, rarely requiring attention, and more efficient in reducing flexion deformity than the traction-splint. We refer to the Thomas hip-splint.
>
> Before the time of the late Hugh Owen Thomas of Liverpool, Mr. Hilton used a somewhat similarly shaped splint for the reduction of deformity; and since that time Blanchard of Chicago, and others have used a somewhat similarly shaped splint. Most surgeons, however, have lost sight of the essential principles[1]

[1] The word "principle" is used many times when only "point" is intended. Thomas himself made the remark that, "Men admire my splints as though I were a blacksmith, but the principle upon which they were constructed, they would never see." For Dr. Ridlon's "principle of construction" etc., "a point of construction" would convey the more exact meaning. The "principle" to be kept in mind during construction of the splint is "rest" in correct position for →

of construction and use of the Thomas splint. The essential principle of construction is that it be made of soft iron of a thickness that cannot be bent by the patient, but can readily be bent and fitted by the wrenches of the surgeon. The essential principle in the treatment is that the brace be so applied that it absolutely prevents antero-posterior motion at the joint. Splints of this general pattern when made of steel cannot be accurately fitted because of their elasticity; if made heavy they cannot be bent even with the aid of wrenches; if made light the vibration rendered possible by their springiness counteracts all the beneficial effects of immobilization. Splints that are curved to follow the outline of the patient, like the Blanchard splint, lose much of their immobilizing force from lack of the greatest possible leverage. Lateral traction, as illustrated in the Blanchard splint, and in the Phelps traction-splint, appears to us to be an absurdity. That the lateral traction exerted by these two splints is an added means of immobilization we will not deny; but we do deny that they act in any way to distract the head of the femur from the acetabulum; and it appears to us that this fact should be self-evident to any orthopedist or to any anatomist.[2]

Thomas was concerned at all times with the patient's efforts to immobilize his diseased joint by muscle and ligament fixation and to contribute to his own recovery. He conceived it to be one of the first duties of the surgeon to understand these "natural" methods of recovery from disease and to assist nature in any way he could. Thomas said:

Deformities in connection with the hip-joint are explicable by no other assumption than this, that they are mainly caused by muscular action acting under the direction of the sufferer's

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← which fit, adjustability, fidelity as to wearing the splint, and its application and removal without harm to the patient are "points" to be observed by all concerned—including the surgeon.

Thomas must have had Pope's line in mind:

"Fools admire, but men of sense approve."

[2] RIDLON, J., and JONES, R.: *Lectures on Orthopedic Surgery*, pages 156-157.

(subconscious) will, as it is otherwise impossible to account for the four distinct variations of deformity that are to be met with. The various signs attendant upon hip disease can not be accounted for, by the capsular distension hypothesis, or by a consideration of the reflex action of the nerves distributed to the joint (this was Hilton's view) and its appendices or nerves

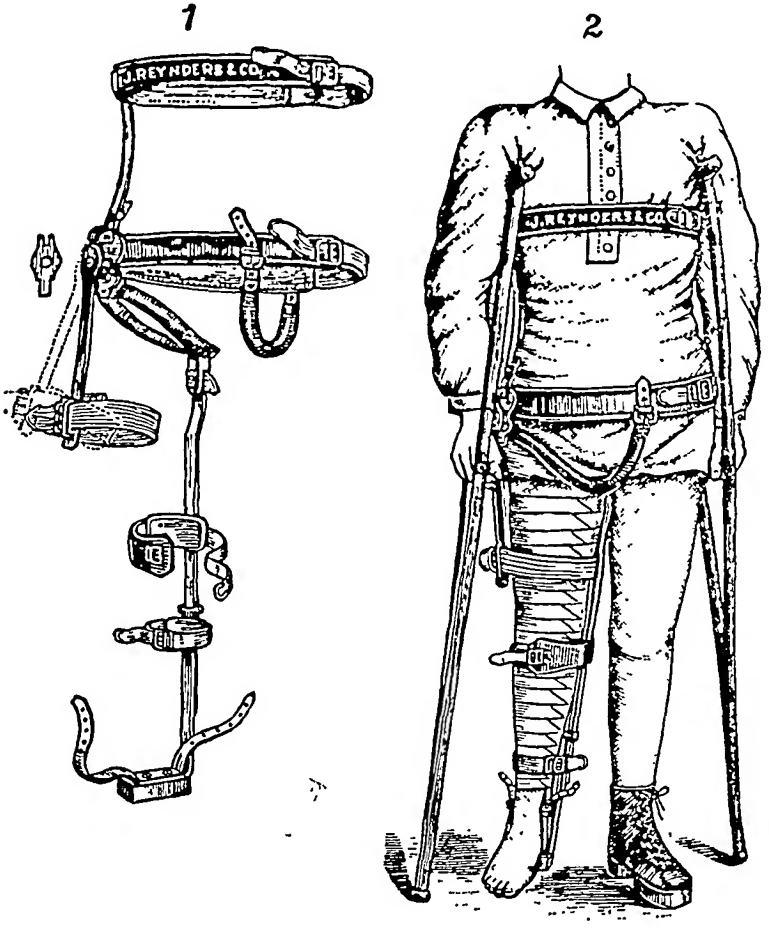

Fig. V. (1) Phelps splint for hip joint disease. (2) The crutch and splint adjusted, the patient using crutches and standing upon a high shoe upon the well leg. (From Phelps, A. M.: *Hip Joint Disease*, Lecture at New York Post Graduate Medical School.)

Fig. VI. Hugh Owen Thomas demonstrating his diagnostic method. (From Thomas, Hugh Owen: *Diseases of The Hip, Knee and Ankle Joints,* T. Dobb and Co., Liverpool, 1876.)

distributed to separate integral parts of the hip, though it is probable, that when the muscles, which control an inflamed articulation, are exerting their power to fix and give rest to an articulation, reflex nerve sense is also operative in some degree.[3] (Yes, by causing muscle spasm or fixation—as explained by Marshall Hall.)

Mr. Thomas cites the following case to illustrate the proper use of all the physical findings in making a diagnosis:[4]

The surgeon was consulted by a man, about 22 years of age,

[3] THOMAS, H. O.: *Principles of the Treatment of Diseased Joints,* page 12.

[4] See the discussion of "sound" and "unsound" joints, etc., in Chapter III.

accompanied by his sister, a Glasgow district nurse. The consulted (Mr. Thomas) specially requested the patient and his attendant, not to give him any clue, as to which of the two hips was the affected joint. The patient was placed supine, the surgeon's usual single test applied and he announced his diagnosis, as inflammation of the right hip joint. The patient and his attendant immediately contradicted him, maintaining that it was the left one. The surgeon then modified his diagnosis, without total recantation, and stoutly maintained that in the past there had been inflammation of the right hip. The surgeon was now conscious, that he had missed an opportunity for a display of his acumen by omitting to doubly test the patient (both hips). He now proceeded to do so, and was able to affirm the patient's asseveration, that the left hip was affected. By further conversation with the party, the following information was gained, that the patient was a tailor by trade, and that for several years he had been unable to cross the right thigh with the *left in the* manner of tailors. The actual condition of the patient was,

Fig. VII. Hugh Owen Thomas demonstrating the compensating curve when the limb is extended. (From Thomas, Hugh Owen: *Diseases of The Hip, Knee and Ankle Joints,* T. Dobb and Co., Liverpool, 1876.)

slight flexion and limitation of motion of both hip joints, from a secondary cause—trochanteric inflammation.

The foregoing incident is truly typical of the omissions we are apt to make, and it brings to my memory many cases, where the omission (to examine both hips) described was not committed by me, and so the patient's confidence was gained early. I will now describe the details of double hip testing (See Figs. VI and VII.)

The single hip test having satisfied the surgeon, that one of two joints is or has been affected, he releases the untested limb from the fixed position in which it was held while testing the suspected and detected one, then flexes the detected one as far as it will go without tilting the pelvis—that is overstraining the test, where it is obvious the flexed thigh there shown does not go to the normal degree without tilting the pelvis. Then the surgeon, steadily fixing the abnormally limited flexed limb, instructs the patient to extend the uncontrolled one, now if that, is or has been affected—and never undergone treatment—there will be noticed some limitation of its extension; this constitutes double testing.[5]

Much of the criticism of Thomas, brought on by the claims of both Thomas and Ridlon, was the result of the personal allusions in the pages of Thomas' books. Thomas' style of debate was such as to stir the animosity even of non-participants in the controversy. Dr. Ridlon who was always on the side of Thomas in this discussion "called him off" on some occasions because Thomas was obviously injuring his own cause by unfairness toward some of the New York champions of the "American" apparatus.

Nevertheless the following and some of Thomas' other arguments should be read because they give an insight into his thinking about the principles involved in treating joint disease, and also because it has now

[5] THOMAS, H. O.; *Fractures, Dislocations, Deformities, and Diseases of the Lower Extremities,* pages 217-218.

been shown that he was right, and most of his critics were wrong.

The Mechanical Treatment of Hip Joint Disease

From a very assailable position, an eminent United States surgeon, armed with a certificate referring back to the year 1872, has judged it worth some trouble to lay claim to a part of the furniture designed by me. Having read Dr. Andrew's certificate and Dr. Blanchard's claim, as published in the *Medical Standard* of Chicago, January, 1890, it is my opinion, that I need not make use of a fact usually allowed in defence, that is, priority of publication. Then setting aside the question, his position is still assailable. If Dr. Blanchard, before making his claim public, had taken the trouble to read my volume, published in 1875, he would have there found a case recorded, for which the hip splint was used, dating as far back as 1867; it had been in use then, I think, about two years.

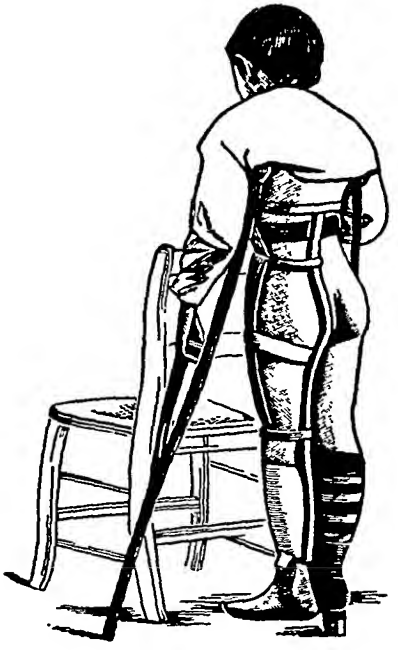

Fig. VIII. Blanchard hip splint. (From *Chicago Medical Journal and Examiner*, June, 1890.)

In the year 1868, again employing my present model of hip splint, the son of Mr. Owen Einon, lumber merchant, of Utica, New York, was treated with permanent success, and this after the failure to avoid deformity during treatment elsewhere. This patient died many years afterwards of phthisis. In the same year, the son of Mr. Griffiths, chemist, of Aberyron, South Wales, was subjected to the same mechanical treatment of hip joint disease with success, and he is now living.

Dr. Blanchard asserted that "the invention, even to the minutest detail of appendage and use," was his own, but this he qualified as follows: "Some surgeons have noticed, that my hip splint is exactly the same, with extension, in an axis with the neck of the femur added."

So Dr. Blanchard's splint is at least a variation as to "the minutest detail of appendage." As to the use of this appliance, how has it happened, that while I was assailed by the majority of American Orthopedic Surgeons, as having introduced an invention theoretically wrong, impracticable and injurious, that Dr. Blanchard never once, during fifteen years, came to the rescue! It is true, he has not opposed me. In justice to Dr. Blanchard we ought to suppose, that had he the theoretical and technical knowledge necessary for making the splint a success, he would long ago have rushed into the fray, and not nursed his grievance so long. A perusal of Dr. Blanchard's article inclines me to the belief, that if he has seen my hip appliance, he has no practical knowledge of my method of fitting, without which it becomes merely a side splint, rather than a posterior one. A perusal of my writings will show, that I tend to err on the side of over, rather than under, stating my debts to predecessors, as I ought, knowing that many of them are no longer alive to state their claims.

Having disposed of the only claimant, who has appeared against me, I will now try and answer objections advanced against the practical application of posterior fixation, by means employed by me. As American surgeons have honoured me with fully as much attention as I deserve, their objections will be reviewed first. In the *Boston Medical and Surgical Journal,* October 24th, 1889, there is published a paper by a Mr. Huddlestone of Boston, Massachusetts. The paper was compiled, not from practice, but from gleanings in the Boston Children's Hospital; Mr. Huddlestone informs his readers, that "it has been found difficult to fit the splint, and more difficult to keep it in its place after being fitted," or to simplify his expression, after fitting it would not fit. Where was Dr. Blanchard,[6] when the gentleman was in this difficulty? The calamities, reported by Mr. Huddlestone as having followed the application

[6] In Chicago—a long way from Boston—in 1889!

of the so-called "Thomas Splint," were certainly remarkable, "One patient died and one has not been heard from." [7]

It was criticism of his contemporaries like this, about the treatment of intra-abdominal conditions as well as joint disease, that involved Thomas in controversies with his colleagues in London, Liverpool, and America. There has always been a certain influence upon the profession exerted by the code handed down to us from the time of Hippocrates, that physicians must not criticize each other. The Hippocratic Oath specifies that we are to treat our professional associates like brothers, and those who teach us the art of medicine, like fathers. This degree of veneration and respect for those whom we occasionally find in error, has been a strain upon others than Hugh Owen Thomas of Liverpool. Obvious derelictions in practice due to neglect, ignorance, misconduct and personal ambition, financial or otherwise, have always made difficulties between those whose ideals are higher, whose professional conduct is better, and whose regard for the patient, both as a patient, and as a human being, is somewhat different from those with different standards whom we occasionally encounter in our professional work.

Thomas was one of those who did not hesitate to speak out when he saw patients treated badly, according to his professional and personal ideas. Thomas was a sincere student, who, although the descendant of bone-setters, had educated himself out of the quack medicine class, and into a field where he felt himself competent to teach and to criticize and correct. He did indeed set standards of diagnosis and surgical practice, which

[7] THOMAS, H. O.: *Fractures, Dislocations, Deformities, and Diseases of the Lower Extremities,* pages 225-227.

should influence us even now. This has been amply demonstrated in the seventy-five years since his regime in Liverpool. That Thomas was denied recognition by the Royal College of Surgeons, in London, and that he suffered the displeasure of many of his professional contemporaries must be charged in large part to the bitterness with which he assailed inadequacy upon the part of some of the London surgeons, in dealing with conditions with which Thomas had made himself familiar, and with patients suffering from conditions for which he provided better care than most of his professional contemporaries. A comparison of his results, with the case reports published by others at that time, or now, will reveal the justice of his position, and even of many of his critical comments. Thomas' conception of the principles that must dictate methods of diagnosis and even some of the technics that he advocated, we know now as he knew then, are the means of preventing much suffering, of saving many limbs and lives, and of making a permanent contribution to surgical practice. It is to develop these features of his work and perpetuate his influence that the present pages have been prepared.

There were, and may still be those who feel that Thomas was much too dogmatic about minor points of technique in the construction and application of his "furniture" or apparatus. But it should always be remembered that Thomas had a definite physiologic objective and that he was guided by inflexible demands as to position and immobilization in every case. For him, therefore, the requirements of every clinical situation—in his own patients, and even for those he saw described in the writings of others—were always quite clear, and nothing less than the treatment that he had

devised for that clinical situation was enough. For example:

Several American surgeons have objected to the leverage, inseparable, they say, from the treatment of the hip joint by posterior fixation; they quite overlook the fact, that the leverage ceases as soon as the utmost flexion has been reduced, and continues in abeyance, so long as the fixation is kept in a state of efficiency. Those surgeons who persistently advance the "leverage" objection against my treatment, as well represented by Dr. N. M. Shaffer of New York, who is known to me as the author of the most rationally written volume on *Spinal Curvature* that I have ever read, but the author of the most irrational contributions on *Joint Diseases*. His last contribution on this subject appeared in the *New York Medical Journal*, November 23rd, 1889. In that contribution to hip-joint disease, like a politician in office, he argues for, in one part and against in another, so that, whatever be the ultimate decision of surgeons on the disputed point, it will remain a vexed question what Dr. Shaffer's opinion really was. A critic, weighing this article by Dr. Shaffer, remarks:

"He teaches treating ostitis by immobilization, and synovitis by motion, that is to say: When the bone is diseased and the articular surface not, he would immobilize; while, when the synovial membrane is diseased, and the articular surfaces are affected, then he would give motion. He uses the Taylor hip splint, when the disease is in cancellous tissue of the head of the femur, which does not immobilize. While in tubercular synovitis of the knee, he uses a splint, which does pretty perfectly prevent motion at the joint. He cries loudly for traction to relieve traumatic contact, he uses it where the disease is not located at the articular surface, and does not use it where the disease is located, at the articular surface. He cries out against leverage in hip disease, but uses the Taylor splint, which being placed laterally allows the joint itself to become the fulcrum."

Dr. Shaffer, in this and other lectures, maintains concussion and intra-articular pressure to be the main evils, contra to my opinion, that friction and surgical compression are the prominent factors maintaining and aggravating the complaint. At

the close of his contribution, he points to Mr. Huddlestone's paper as evidence in support of some of his opinions.[8]

Mr. Thomas was very impatient—as he admits himself, "intolerant"— of such obvious inconsistencies. He maintained, correctly, I think, that those who were guilty of technical methods that contradicted each other (like violating asepsis by putting maggots in surgical wounds) had either no knowledge of, or no regard for surgical principles, and Thomas' demand was for surgeons who were neither ignorant nor dishonest.

A few rules, relative to the proper order of applying the hip machines described in the preceding pages, will not be out of place here; by adhering to them, the operator saves time, avoids annoyance and the appearance of roughly handling the patient:

First: The initial act should be, to place the machine so far posteriorly, that it is just out of sight at the buttock part, when the patient is lying horizontally.

Second: The machine should be pushed upwards, until the upper wings are close up to the patient's axillae.

Third: An assistant should grasp the patient's leg together with the lower part of the main stem, to hinder the machine from slipping downwards, while the operator is manipulating it.[9]

Fourth: The Surgeon should proceed first, to closely fit the wings which grasp the sound side of the trunk, thigh, then leg; afterwards the wings are adjusted.

Fifth: The shoulder braces, (American "suspenders") are to be adjusted, afterwards the thigh and leg bandages.

Sixth: The patient or his friends, should be warned of the symptoms to be expected, during the few hours or days that follow fixation.

Seventh: The short, or walking machine, is totally untrustworthy for aiding resolution of primary disease of the hip-joint,

[8] Ibid., pages 230-231.

[9] The main stem and the other parts had been fitted to the patient before they were assembled into the hip splint or "machine" now being applied.

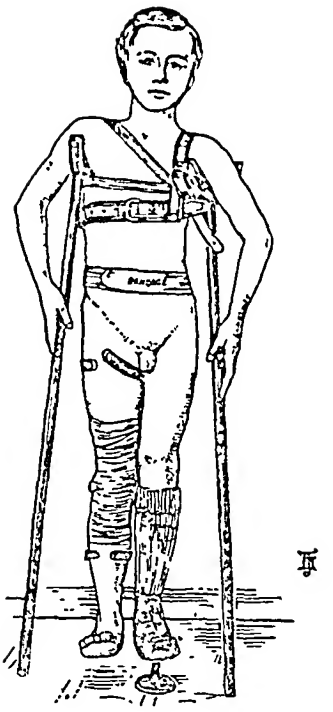

Fig. IX. Anterior view of hip appliance with patten and crutches as used for locomotion. (From Thomas, Hugh Owen: *Disease of The Hip, Knee and Ankle Joints,* T. Dobb and Co., Liverpool, 1876.)

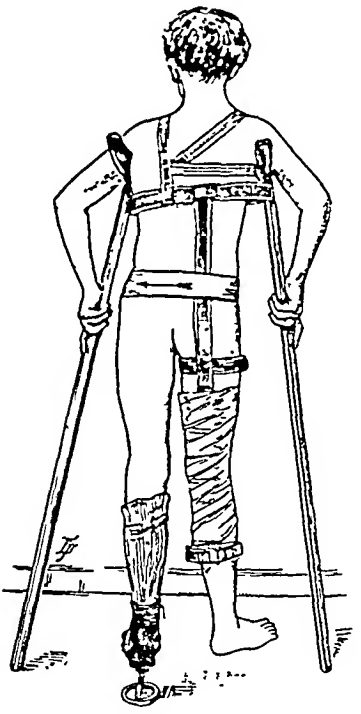

Fig. IX. Posterior view of a hip appliance with patten and crutches (iron) for locomotion; the splint must sling on the sound side to avoid rotation. (From Thomas, Hugh Owen: *Diseases of The Hip, Knee and Ankle Joints,* T. Dobb and Co., Liverpool, 1876.)

and equally unreliable for some cases of inflammation of the hip arising from a secondary cause. As a protector or conservator, where we have cases of permanent anchylosis, it is very valuable, from the fact that by its use, we give the patient some further degree of liberty, at a time when we are in doubt of the advent of genuine recovery, the character of anchylosis not being so confidently possible of early detection.[10]

[10] THOMAS, H. O.: *Fractures, Dislocations, Deformities and Diseases of the Lower Extremities,* pages 258-259.

The details repeated here (and at several places in Mr. Thomas' books) will seem superfluous to those surgeons who dismiss their patients after operation to the brace maker. Mr. Thomas was a better surgeon than many of his contemporaries, but certainly a "strap and buckle" surgeon in the best sense of the term. He knew better than his mechanics in the shop—and we should know better than any brace shop mechanic—what the patient should have from his splint or brace, and how he is to get it.

Those who classified Mr. Thomas as only a brace maker ignored the often repeated references to clinical symptoms and joint damage in his case reports. Thomas' use of immobilization to relieve muscle spasm and pain, to prevent or correct deformity, and to arrest or modify the progress of joint disease was the most rational and logical therapeutic program, even from the standpoint of pathologic findings that has yet been proposed by anyone. So, even a misinterpretation of the relationship between the pathology of joint disease, and the indication for treatment attracts his attention, as follows:

> In Dr. Taylor's treatise on *Mechanical Treatment of Hip-joint Disease,* we find this mysterious statement: "There be cases in which the mechanical treatment on account of pathological conditions, is not applicable; let such be left out of consideration."
>
> And again we find in it the following conclusions: "*First:* To relieve the pressure in the joint due to muscular contraction, by temporarily destroying the muscular irritability and contractility. *Second:* To protect the joint from weight and concussion."
>
> "The indication for arresting motion in the joint, which is well met by the gypsum bandage and similar expedients, pertains only to a condition of rigid muscular contraction, and consequent increased constant pressure in the joint. But no such necessity exists after the muscular rigidity has been over-

come to the degree of entirely removing all pressure within the joint.

On the contrary, motion in the joint without pressure is not only not injurious, but beneficial."

Let Dr. Taylor's teaching be compared with the published opinion of Mr. Marsh (who represents "weight and pulley treatment" in this country), taken from his published opinion: "The time at my disposal does not allow me to do more than thus very briefly describe the principle of these instruments and the method of their construction; and in so short a notice it is not possible to do them justice. But you may find a full account of them in Professor Sayre's recently published *Lectures on Orthopedic Surgery* (Churchill, London), or in Dr. Taylor's essay on the *Treatment of Disease of the Hip-joint*" (New York).[11]

The great apostle of the American method, Dr. Sayre, is well known to us. In lecture XIV of his published work on *The Joints,* referring to ankle-joint inflammation, he teaches thus:

"By the splint I prevent motion which would be the cause of relapse. I should do well, I think to explain to you when motion is injurious, and when it is demanded. So long as there is active inflammation in a joint, motion is injurious, and rest absolutely necessary."

Why the author should here arrest motion, and not advise its limitation but the very reverse in inflammation of the hip-joint, I fail to perceive. Of course, I can understand motion being permitted where no inflammation exists; sound parts do not require a doctor.

In the same volume is to be found the following: "In looking over Sir Benjamin Brodie's work, I find he recommends positive rest, and that is all. But you may do this—you may rest the joint in splints—but you do not do all that is required. You may keep the limb perfectly still, and locked up in every conceivable way, and yet not overcome the tendency of the muscles to contract—you do not prevent the reflex action."

Here Dr. Sayre is certainly mistaken, for in page 139 of Sir Benjamin Brodie's volume on *Disease of the Joints,* fifth

[11] Ibid., page 288.

edition, 1840, he will find that the extension method (or counter-extension) is advised, and details for its practical application are given, but I must admit that the arrangement would not allow of the application of a hundred and fifty pounder, as Dr. Taylor reports, but which Dr. Sayre says, is not essential. "Simply enough extension to overcome the reflex contraction of the muscles." [12]

At pages 262-263, the Sayre hip apparatus and its mode of application are given, and the inventor mentions that other means must be used during the night, such as the weight and pulley; this latter he designates "bed extension." At page 268, the information is given that the appliance cannot support the weight of the body, and crutches are advised as accessories. Up to the time of reading this page, I understood that Dr. Sayre taught that his splint prevented intra-articular pressure, if it cannot sustain the trunk weight, it certainly cannot relieve intra-articular pressure. From the last and following paragraph of page 269, it is apparent that Dr. Sayre, like Dr. Taylor, has not found the value of a simple but very important aid in the mechanical treatment of this affection, namely, locking the knee-joint, which alone, I suspect would, in the treatment of early inflammation of the hip-joint, give results quite equal to those obtained by the use of their own illusive machines.[13]

The quotations which I have given from the published writings of Tractionists and Extensionists, show that they are not in agreement with each other as to the foundation of treatment; consequently their disagreement in practice is very pardonable. But besides the above set of practitioners there are other sects of orthopedists known as the Do-nothings, they remind me of a late United States political party, who rejoiced in being termed the Know-nothings, and I believe they will be equally as short-lived as the latter. Dr. J. C. Hutchinson was the premier of this party. In the *Proceedings of the Medical Society of the County of Kings,* U.S.A., Vol. IV, No. 2, for April, 1879, we find given to us the "planks of their platform" in an article on the *Mechanical Treatment of the Hip, Knee, and Ankle-joints by a Simple and Efficient Method—the Physiological Method—With Cases.*

[12] Ibid., page 290.
[13] Ibid., page 294.

On a careful review of Dr. Hutchinson's article, I find he was quite as capable of refuting himself as any tractionist. In this article Dr. Hutchinson nowhere acknowledged an indebtedness to me for any part of his mechanical device, but for this omission he is absolved, by his extreme condescension in having adopted as a title to his paper the larger portion of a title-page of a volume published by myself in 1875. The principles of treatment advocated by Dr. Hutchinson were the following: "The indications for the mechanical treatment of inflammation of the joints of the lower extremities are to secure immobility, extension, the removal of the super-incumbent weight of the body, and means of enabling the patient to take open-air exercise. The accomplishment of these indications, and the use of judicious medication and proper hygienic influences, comprehend all the principles of treatment." [14]

The foregoing review was published in the early part of the year 1889. In September, of the same year, at the meeting of the American Orthopedic Association, held at Boston, Massachusetts, under the presidency of Dr. E. H. Bradford, a paper was read on *Rest and Fixation* by Professor De Forest Willard, M.D. In my opinion, it would have been better to have entitled it, *Refutation of the Teaching and a Protest Against the Practice of a British Surgeon.* It is my purpose to terminate this review by an attempt to defend the person criticised. (Mr. Thomas, of course.) It would have been more congenial labour to me if the critic had, before publicly dissenting from Mr. Thomas, read the latter's statement of principles and descriptions of practice, as then, it is very probable that Professor Willard would have been a consenting, rather than a dissenting party. Professor Willard and Mr. Thomas differ only in degree, but that very materially, viz: as to how much rest can be got, ought to be given, and whether in repeated doses or one continuous dose.[15]

The remark, that "all of Mr. Thomas' cases have been in private practice," is intended to convey to the reader the impression, that they were treated under specially favourable surroundings. Professor Willard, like most of us, believes that our surroundings influence, sometimes decide for us. The conditions

[14] Ibid., page 296.
[15] Ibid., page 307.

Professor Willard refers to with regret, informs us he very seldom enjoyed, because, during all his professional life he has worked amongst what is termed the "lower orders," and envious of surgeons "who had the advantage, when necessary, of (their) patients being indoors," at the expense of a suitable institution. Mr. Thomas not only had to contend against unsuitable surroundings, but against "touters," on behalf of hospitals, who cross his path in the guise of City Missionaries, District Nurses, and others, who judged that because he possessed not these appointments, aids to fame, that his incapacity had barred the way. All contained in the *Contributions* was gleaned in the "Courts," not the "Squares," of Liverpool.

"Our surroundings influence us." The field in which Mr. Thomas worked, entailed a heavy physical and pecuniary strain, that stimulated him to devise means, while effective to resolve the lesion, relieved him of much toil, and in this endeavour, culled information which enabled him to extend the grammars of the questions that have been in dispute between himself and critical friends in the art, enabling him to push forward an "act of uniformity," the "Flexion Test," for influencing the management of all diseased joints.[16]

In 1902, Professor Kirmisson (see the annotated bibliography), divided his discourse on the treatment of hip-joint disease into two parts: (1) on continuous weight and pulley extension, and (2) immobilization. For the first method, he accords credit to La Sauvage, who advised this method in 1835, and also to Volkmann, and to Charles Monod, who wrote a critical review in 1878, in the *Archives de médecine et pharmacie navales.*

Kirmisson discussed the advantages and disadvantages of weight and pulley extension, and devoted most of his discussion to this method of treatment. He described several varieties of apparatus, and referred briefly (p. 136) to Thomas, and to the American

[16] Ibid., page 315.

method, which had been extensively discussed before that time.

Lannelongue and Bonnet, had suggested technical details with regard to weight and pulley traction, which are discussed and recommended. For immobilization, Kirmisson had no splint or apparatus, but devoted considerable space to a description of the use of plaster-of-Paris. This he obviously used very well. He quoted Verneuil, Ollier, and Trelat and other French colleagues, and described a leather cuirass. The Sayre splint, and the Thomas posterior hip splint, are illustrated, but given a secondary place. Kirmisson discussed at considerable length, the suggestion of Sainton, (1897) regarding forcible manipulation to correct deformity due to hip joint disease. Kirmisson found this a dangerous procedure, inasmuch as of twenty-seven cases reported, five died of tuberculous meningitis, or miliary tuberculosis. From the standpoint of Thomas, the obvious defect in the method of forcible correction employed was that it was done too violently, and without adequate control of the diseased area, before, during, or after the manipulative procedure. Thomas would probably have found some of these cases unsuitable for such vigorous treatment. They were apparently manipulated during stages of the disease in which Thomas would have preferred immobilization until a more favorable time had arrived. Or, Thomas would have corrected some of these deformities as he usually did, by gradual straightening in the Thomas hip splint, and not by any forcible manipulation at all. Kirmisson seemed to mention gradual straightening of such deformities, without reference to the suggestions of Thomas or anyone else.

It may be assumed that Thomas in his busy practice

was beset at times by the same difficulties as plague the rest of us. But Dr. Ridlon often referred to, and Mr. Thomas was obviously a little annoyed by, the report that Dr. Ridlon published upon his return from Liverpool in 1890, (*New York Medical Journal,* III, No. 14).[17] This article was the result of a "check" of sixty-two cases observed during Ridlon's twelve days in Liverpool. It was shown that somewhat less than ideal standards of patient care had been observed in many cases. Dr. Ridlon saw patients with short splints, no crutches, activity with muscle spasm and pain, and even ambulatory cases with unreduced deformity. In general, however, Dr. Ridlon found most of the patients doing well, and especially those in long splints and without traction far better than he expected because in "the American Method" traction was thought to be indispensable.

[17] See also first part of this chapter.

CHAPTER V

Disease of the Knee Joint, Foot, and Ankle

MR. THOMAS, at several points in his books, admits his indebtedness to preceding writers for some of his ideas regarding the treatment of joint disease. Mr. Bryan Crowther of London, may very well have been one of these. Mr. Crowther, who wrote *Practical Observations on the Disease of the Joints* in 1797, was a pupil of Percival Pott, and a careful student of all the ancient writers in regard to joint disease. From Mr. Pott he learned the plan of treatment which consisted of blistering around an affected joint, and setting up artificial draining sinuses in the neighborhood of a diseased joint in order to assist in bringing about subsidence of swelling, relief of discharge, and recoveries in many such cases. He reported a series of thirty-one cases in which such treatment had been employed, and with many excellent results. Several of Mr. Crowther's comments are such as might very well have proved profitable to Thomas in his thinking about these conditions. Among other things, Mr. Crowther remarked:

Patients afflicted with white-swelling, are often encouraged by practitioners to hope that the complaint may terminate in

ankylosis; but this, unfortunately, is a very infrequent occurrence, and cannot reasonably be expected; whilst the disease is suffered to proceed. Ankylosis is a process of health, (that is of repair) and, as such, can it be expected to occur, until the progress of the complaint in the bone be arrested?

I shall not attempt to determine whether the reason I have already assigned, will account for the infrequency of ankylosis in this disorder; yet, as a proof how seldom it occurs, I have seen but two cases of the knee, and one of the elbow, ankylosed by ossific union. Other instances of knees ankylosed by a conjunction of soft parts, have also occurred to my notice; which joints, though incapable of flexion, yet admitted a degree of motion, just enough to prove, that ossific matter had not produced the union; fortunately for these patients, the leg and thigh had been kept, during the cure, in an extended state.

Perfect quietude of the limb is required for the recovery of a diseased joint;[1] but more particularly if the part should be in disposition to ankylose. Too great attention cannot then be paid, if the disease is of the knee, that the leg be kept extended; and, if in the elbow joint, that the arm be kept bent, for inattention to proper position of a limb affected with this disease, has often rendered it useless, though the complaint was cured. At the time I inserted some observations in the fourth volume of *Medical Facts, I was not then aware of the necessity of absolute rest, which I have since found to be indispensable in these cases.*

Much objection to keeping the joint in a state of rest has often been urged by the patients, or by their friends, *from an apprehension that the joint would become rigid,* but I have never hitherto found rest produce such an effect. In every case under my care, of white-swelling of the knee, the limb has been kept extended, in some cases for many months, and, in one, during a space of two years; *yet the joints have never been rendered rigid, or their motion impaired.*

It appears to me, that joints becoming rigid, is rather *a consequence of disease,* than arising from a position of the limb; and I am confirmed in this opinion, by having seen several joints rigid by this disease, completely set at liberty, merely by the effects of a purulent drain derived from the integuments

[1] Italics ours (H.W.O.).

surrounding the complaint.[2] (This was the treatment advocated and taught by Mr. Percival Pott.)

Mr. Crowther's further observations upon the kind and extent of complications in joint disease including mixed septic infections, are of considerable interest when one remembers that he knew nothing about germs, or about the metastatic methods by which abscesses might have been carried. He calls attention to the dangers of incision, the dilation of sinuses, and of contribution to complications by improper movement and use of the affected extremities. Mr. Crowther suggested, but did not understand the rôle of ligaments and muscles in causing deformity. One gains by reading his book, an impression as to the tremendous addition Thomas made to the entire subject only seventy-five years later. Crowther's quotations from the ancient writers, his own observations and case reports, when compared with Thomas' writings, gives one a good idea of the evolutionary manner, in which nearly all medical and surgical knowledge has developed, and must develop. Apart from those rare single discoveries, we progress by the culmination and climax of a long period of observation, study, and thought such as that at which Thomas was able to arrive. Those contributions to our knowledge of pathology, our understanding of infection and inflammation and our improvements in technic as to immobilization and rest, are all evidence of the manner in which progress must usually be made in all surgical practice.

Among the notes regarding the early use of the Thomas hip splint which I received from Doctor Ridlon

[2] *Practical Observations on the Disease of the Joints, Commonly Called White-Swelling. With some remarks on Scrofulous Abcesses,* C. C. & J. Robinson, London, 1797, page 17.

in his own handwriting, is the following which he said was a copy of a letter written to Doctor McBurney before Doctor Ridlon left New York (1889) for Chicago.

Dear Doctor: Herewith, are the rules for treatment of chronic joint disease which I promised you the other day. First, the existing deformity should be corrected rapidly, or immediately. Second, when the deformity has been corrected, complete and uninterrupted immobilization should be maintained, until the cure is effected. The reduction of any deformity inflicts the same amount of traumatism, whether done at once (rapidly) during a few days, or slowly during many weeks. Thomas held that recovery was more rapid when deformity was not present,[3] than when it was present, but this I have not verified.

Immediate correction of displacement and deformity, no matter at what stage first seen by the surgeon, is most important in all fractures, especially compound fractures. This restores the damaged parts to anatomic relationship, so that correct physiologic function of the limb is restored to the greatest possible extent. That this rule was applicable in chronic joint disease was the point so often emphasized by Thomas in speaking of the importance of immobilization in correct position. Dr. Ridlon said further, that if we were sure that every joint would recover its normal motion, reduction of deformity would be of less importance, but normal motion is far less frequently the result when the joint is deformed than in the straight position. This would seem to be obvious, and for physiologic reasons, from the teachings of Thomas, as indicated above.

[3] In either joint disease or fractures, all the parts should be in correct position—at once and all the time. This will prevent pain and muscle spasm, and affect favorably the patient's efforts to resist infection, and repair his tissues. (H.W.O.).

Those who are interested in the history of the surgical treatment of tuberculous joints, will find no more interesting paper on that subject than the one presented by Dr. J. D. Griffith of Kansas City, at the meeting of the American Orthopedic Association in St. Louis, in 1893. Doctor Griffith not only explored the entire history of the treatment of tumor albus of the knee, but put on record a statistical study of various kinds of treatment obtained from an extensive correspondence with surgeons, at home and abroad. All of the data from this study were arranged, tabulated, and analyzed in the preparation of his paper.

As a result of some of the professional controversy that Thomas stirred up, he brought a considerable amount of personal criticism upon himself. Very good surgeons like Adams, Marsh, and Paget in England, and, like Sayre, Taylor, Willard, and others in America, not only defended their own practice, but objected to the dogmatic way in which Thomas demanded the adoption of his splints, and methods. These rested empirically (they thought) too largely upon clinical findings and mechanical treatment in Thomas' own practice. They called attention to the fact that Thomas made very little use of the newer scientific findings in pathology, bacteriology, and chemistry in planning his care of patients, either with intestinal or joint disease. They hinted that surgical operative methods, medication and massage and exercise, were being neglected in the Thomas therapeutic program.

In order, partly, to meet this criticism, Dr. Ridlon and Robert Jones, undertook some study of the underlying pathology of joint disease, and published as joint authors, a rather formidable article for that period, in *The North American Practitioner* of October, 1892,

and *The Provincial Medical Journal* of Liverpool, England, at the same time. Both Dr. Ridlon and Robert Jones had made a study of some of their own findings in joint disease, but they relied very largely upon the gross and microscopic findings of Segor Krause, of the University of Halle, who had made an extensive study of bone and joint changes in tuberculous, and other kinds of bone and joint damage. The sixteen illustrations used by Doctor Ridlon and Robert Jones, from hip, spine, and shoulder lesions, are classic illustrations of destructive disease in those areas, as we now understand them. The microscopic pathology of bones, joints, and surrounding tissues, the result of tuberculosis, syphilis, and the suppurative diseases, was not then as well understood as it has come to be since that time.

It may not be amiss, however, to comment that the diagnostic and therapeutic conclusions arrived at from this early study, were not too different from those we should adopt, even at the present time. While it is true that considerable differentiation has been made since 1890, the alterations in progress of joint disease, whether of the chronic or acute infectious variety, have by no other kind of treatment been influenced so much, as by efficient immobilization and rest, ("enforced, uninterrupted and prolonged") as advocated by Hugh Owen Thomas, almost seventy-five years ago. On the other hand, hundreds of chemical therapeutic suggestions directed at this or that tissue change, or at different kinds of bacterial or other tissue invasions, have all fallen by the wayside in the meantime, having been demonstrated to have no influence upon the progress of such destructive disease, nor any influence upon the repair of such diseased tissue whatever. Those of us

who are older in the practice, can recall the application to and injections into diseased joints, exploration for the introduction of therapeutic agents, or even bone transplants, and many other kinds of therapeutic experiments, no one of which, or all together, will show as much improvement or as many beneficent results as the use of Thomas splints, plaster-of-Paris casts, or other efficient aids which assist the patient, when used as Thomas suggested, in making his own recovery.

One of Dr. Ridlon's favorite anecdotes with regard to Mr. Thomas' care of patients with joint disease was the following:

When Dr. Ridlon visited Mr. Thomas in 1887, he was attracted, among other things, by a liquid which Mr. Thomas applied to the skin in the neighborhood of a diseased joint. This was painted on out of a wide-mouth bottle with a brush; then the limb was placed in the iron, or appliance which Mr. Thomas had devised for that particular case. The patient was then instructed to return for inspection and observation at about the time when the application to the skin had faded out, or more or less disappeared. In Mr. Thomas' absence Dr. Ridlon took the jar of medicine, and found that it had an odor of shellac. When Mr. Thomas returned, Dr. Ridlon said to him, "Mr. Thomas, this application you employ in these cases, smells to me like shellac."

Mr. Thomas held up a warning finger, and said, "Dr. Ridlon, that *is* shellac."

"Well," said Dr. Ridlon, "why do you use shellac?"

Mr. Thomas' reply was characteristic. He said, "Dr. Ridlon, in a week or ten days, the application of shellac will wear off. That is about the time when the patient should be seen, the condition of the affected joint deter-

mined, and the adjustment of the appliance inspected, especially as to whether or not it is fitting properly, being kept in good condition by the patient, and accomplishing what it is supposed to do. At that time, I can be assured whether or not the program of care, both as to the apparatus and as to the patient himself, is being properly carried out, and can keep him under observation, at such suitable periods, by having him report for fresh applications of the shellac."

Doctor Ridlon was so much impressed, that when he returned to New York, he bought himself a bottle of shellac, and a brush, but said he only had the courage to use it upon a few patients and upon a few occasions, and gave it up for more orthodox methods for keeping the patient under observation.

That Mr. Thomas had a flair for the dramatic, and that he recognized the value of publicity was shown by his red cart with the tandem team, and in other ways. But he had something important for his clientele, and like our own Albee, John B. Murphy, and even Sir Robert Jones—an apparently shy man, he got himself and his work in the public eye.

The criticism that Mr. Thomas was a surgeon of limited or even sectarian tendencies—bigoted as well as dogmatic—is answered by several important changes in his practice. He was influenced both by reading and experience as to certain methods, but not unless the principles which he always kept in mind were satisfied. For example:

> And, whereas in the earlier days of my experience I believed that much aid was given to recovery by passive motion, now I know, by well attested facts, that some of the marvels of my past practice had been marred by the very treatment I was so proud of. It is true that during these latter years I have had

reported to me cases of articular defect marvellously benefited by employing passive motion in their treatment, and many of them I have had an opportunity of examining, but in no single instance could I detect any gain. The reader may question, 'How did it happen that in the past you observed some benefit to arise from the use of passive motion in some articular defects, but that now you fail to perceive that any good, but rather an evil tendency, results from this practice?' There is a solution to this question: The introduction into surgery of infallible tests for each joint, which indicate soundness or unsoundness, and ability to withstand wear or not. These tests enable us to expose as baseless the reputation attached to the employment of passive motion as a means of accelerating the recovery or their utility.[4]

Mr. Thomas was referring here, of course, to cases of knee joint disease. One of the strongest claims of the bone setters to consideration has been their success in the manipulative treatment of "internal derangements" of the knee. From Thomas' own antecedents to Hutton,[5] and down to A. E. Barker of London in World War I, the bone setters have cured knee joints with disabilities unrecognized, untreated, and unrelieved by the regular profession. Regarding this, Thomas said:

The slipping of a cartilage is another form of lesion in which —relief is obtained in most instances by gentle motion in any direction . . . . . In many instances by this procedure . . . . a patient learns for himself.[6]

But we may permit Sir Arthur Keith to have the final word on this matter. He says:

We may justly claim that in modern times surgery has placed

[4] THOMAS, H. O.: *The Principles of the Treatment of Fractures and Dislocations,* 1886, page 67.

[5] Who was "explained" by Wharton Hood.

[6] THOMAS, H. O.: *Principles of the Treatment of Diseased Joints,* 1883, page 75.

the treatment of internal derangements of the knee on a scientific basis. But it is quite apparent from the evidence—brought forward by Mr. Barker—that there is a very considerable number of qualified men who know nothing of Hey, nothing of Annandale, nothing of the discoveries which their colleagues have made these forty years past—who have forgotten their anatomy and their physiology. So long as we have this class of medical men, we shall have, and deserve to have, "Mr. Barkers." [1]

The following paragraphs are from the introductory chapter of the book by Dr. Ridlon and Robert Jones, twelve years after Dr. Ridlon's first visit to Liverpool. There was a sincere intention to expound the principles as well as the therapeutic methods and splints of Hugh Owen Thomas. For many readers, however, one must feel that Thomas fails to emerge as the great advocate of rest that he really was. This seems to be true also of the biographies by Watson and Aitken. McMurray and Sumner Koch, and especially Sir Arthur Keith have much more nearly enabled us to see Thomas as the surgeon, the teacher and therapist of physiologic rest as he must be understood by a true disciple.

Local congestion of the joint and its immediate neighborhood, which has recently come into use in Germany, (the Bier method) is, in some cases, of positive advantage. This method of increasing the nutrition locally was first recommended by the late Dr. Hugh Owen Thomas and employed by him for many years. The recent 'discoverer' appears to be wholly ignorant of Thomas' writings.

The mechanical treatment of chronic joint-disease aims to protect the diseased joint from injury inflicted by movement at the joint, from shocks during locomotion, from the burden of weight-bearing when the joints of the spine or lower extremities are involved, and from the intra-articular pressure due to the involuntary muscular spasm in Nature's attempts at immobilization.

[1] KEITH, SIR ARTHUR: *Menders of the Maimed,* 1919, page 325.

The first and most important problem is the immobilization of the joint. The materials used are of little importance, provided the essential principles are not lost sight of; namely, to immobilize a joint it is necessary to put at rest the muscles governing motion at that joint, and to do this the immobilizing apparatus must extend to the limits of these muscular attachments; to perfectly protect a joint from the shocks of locomotion and weight-bearing, recumbency must be employed; and to counteract intra-articular pressure resulting from muscular spasm, the irritation inducing the spasm must be allayed. This can be accomplished more often than otherwise by immobilization of the joint, but in some instances traction upon the limb is of very material assistance. In a few instances traction aggravates the pain and muscular spasm, and in the vast majority of cases its sedative action is only as an aid to other forms of immobilization. In the treatment of these joints it may be laid down as a law that whatever most quickly relieves pain and tenderness will most quickly relax the muscular spasm and place the joint in a condition favorable to recovery.

The essential of any orthopedic appliance is that the framework be firm, unyielding, and free from tremor; that the padding be sufficient to protect the soft parts from harmful pressure, nor yet so soft nor so thick as to diminish the effectiveness of the rigid frame; and that the covering be such as will not readily become infected with septic microorganisms.[8]

The preceding paragraphs emphasize the point that if a clinician is sound as to his ideas regarding "surgical rest," the details of mechanical therapy will more or less take care of themselves in the hands of a conscientious surgeon. For that reason John Hilton obtained excellent results in many cases of joint disease (see the 1879 New York edition, p. 270) even though he fell short of Thomas' ideals in the matter of splints and far short of Thomas' genius in securing surgical rest for many of his patients.

[8] RIDLON, J., and JONES, R.: *Lectures on Orthopedic Surgery*, pages 13-14.

Regarding the acute, swollen, and painful form of arthritis at the ankle, Mr. Thomas' advice is as follows:

To the mechanical treatment of the suppurative stage of ankle joint disease, in subjects of the second class, I can only contribute the advice that the indirect method[9] should be the local application, supplemented by crutches for locomotion; the affected ankle to be kept from ground, and the error of slinging from the neck avoided; Fig. XIV, No. 8 illustrates the indirect mechanical method applied so as to keep the ankle-joint immovable. Fig. XIV shows the appliance apart from the limb, and is composed of three wings of sheet iron riveted to a flat iron stem sufficiently strong, according to the age of the patient, that it can arrest motion and tremor of the joint, it is retained in place by a bandage applied to the calf portion of the leg and dorsum of the foot, the latter, the artist has omitted to show in illustration Fig. XIV, No. 8.

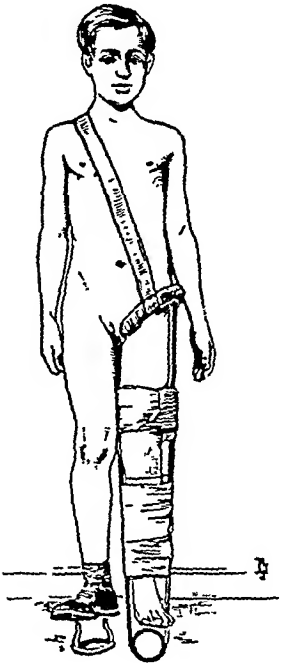

Fig. X. Anterior view of knee appliance ready for locomotion. (From Thomas, Hugh Owen, *Diseases of The Hip, Knee and Ankle Joints*, T. Dobb and Co., Liverpool, 1876.)

The foregoing are the details of the method employed by me in the treatment of this ailment, when the patient is over the age of twelve years. Prior to this age, the treatment is the same as that for adults, with this exception: in place of crutches to aid locomotion, and prevent concussion to the affected limb of the patient, there is fitted to the limb a walking knee-splint, the length of which should be, so that it extends three inches beyond the patient's toes when the ankle is in an extended position; and to the boot

[9] That is, the immobilization of the entire limb.

of the healthy foot is attached a patten three or four inches deep. The arrangement is shown in Fig. IX. See also Figs. X and XIV, 5, 6, and 7. The local treatment of the sinuses ejecting pus slightly varies; at times a porous cloth steeped in a solution of boracic acid, or else medicated wood sawdust, very lightly enveloping the parts draining. As regards operative interference, whether the case be one in adult life or not, if my decision be to attempt complete conservation, then, if cognisant of suppuration having occurred, the integument is allowed to become partly ulcerated, before antiseptically incising the presenting collection of pus. Experience has taught me that an efficient drainage is thus secured with less liability to constitutional disturbance (*Secondary or mixed infection*. H.W.O.), and time saved. As regards the question of excision after thirty years' experience, it is my opinion if the patient be under twelve years of age, the question need never be entertained, and further, at this age, only very rarely is there any occasion to interfere by gouging or scraping the bones.[10]

This was (and still is) the surgical procedure "of choice" by many surgeons for many patients. Actually, especially in young patients, most of them will recover if *adequately* immobilized—then aspirated or even incised, and protected against motion *and secondary infection* until "sound" as defined by Thomas.

In my earlier practice, many articulations were aspirated, when had time been allowed, the liquid would have been absorbed, hence to aspiration was given an excess of credit. Still, it is my opinion, that there are many cases to which the operation of aspiration or of incision ought to be applied, and others, where the effusion shows no signs of becoming absorbed, it is good practice to leave it to ulcerate through the skin. The fourth resource is to continue the fixation and permit the formation of a limited or residual collection of pus, which may or may not at the time of ulceration of the skin, be connected with the part which had been, or is still the seat of disease.

[10] THOMAS, H. O.: *Fractures, Dislocations, Deformities, and Diseases of the Lower Extremities*, pages 47-48.

In my earlier practice, the foregoing sketch of Fabian treatment did not meet with my approbation. I preferred to incise when absorption or aspiration failed, but frequent observation has modified my opinion; the fourth resource gives, in suitable cases, satisfactory progress, generally unaccompanied by any constitutional symptoms.

It was by accident that my practice became modified, thus many patients were brought who resided at a distance, and so it was not convenient to incise, and afterwards, for them to immediately return home. Gradually I noticed that my out-of-town patients progressed to recovery quicker, and with less suffering, than those living close to me.[11]

I heard President Franklin D. Roosevelt say that, at least in part, the motive behind his Georgia Warm Springs project was the following. Doctor Lovett of Boston, had told Mr. Roosevelt that his infantile paralysis patients who went to the sea shore for the summer and *swam in salt water* returned in the fall better in every way than those who had remained in Boston on physiotherapy. So Mr. Roosevelt, because he liked to swim in salt water, rather neglected his physiotherapy, and was somewhat lax as to his splints and braces—and did not improve, perhaps, as much as he might have done.

Mr. Thomas' conclusions here are obviously based upon observations and experiences like those which led Lister to emphasize so strongly the "antiseptic" incision and drainage of cold abscesses. When Mr. Thomas referred to "constitutional symptoms" he was thinking of those incised and drained patients who acquired primary or secondary mixed infection (symbiosis) at the time of the operation or in the course of post-operative dressings. It is a sad commentary on our progress that operations and dressings,

[11] Ibid., page 195.

especially in chronic joint disease and in osteomyelitis and compound fractures, are still being done under less than aseptic conditions, and that mixed infections and septic metastasis are still common complications. This comment applies to both general and hospital practice, and to both military and civilian surgery.

When chronic knee-joint or other joint disease, becomes compounded by the formation of serous or pus discharging sinuses, a local application can seldom be dispensed with and we have to guard against converting the application into a direct interference. With the aid of the protecting inner and outer rods of the 'Calliper,' local dressing can be applied without exercising any pressure, so that the direct method with its evils is avoided. My experience inclines me strongly to the belief, that chronic disease of joints is intolerant of cold, but accepts warmth, as for instance, medicated wood sawdust which, just before applying, has been heated over a fire on a frying pan and changed two or three times a day. If this cannot be used conveniently, then in its place, some warm, moist, porous, and absorbent fabric medicated, is a fitting substitute.[12]

[12] Ibid., page 199.

CHAPTER VI

The Prevention and Cure of Disability and Deformity In Fractures

DURING WORLD WAR I, Sir Robert Jones was chiefly influential in popularizing the Thomas knee caliper splint. By his tact and perseverance he succeeded, as Dr. Ridlon said, in making the Thomas splints and principles, in part at least "acceptable" *even to the military establishment.* The ring caliper splint was used both as an emergency and transportation dressing at the front, and for the treatment of thigh and leg fractures in the base hospitals. Sir Robert emphasized, on many occasions, his preference for fixed or intrinsic traction within the caliper itself, and assisted many of us in the proper fitting and application of this splint for that purpose. Sir Robert was never so consistent in his requirements for the proper fit or for the correct use of this splint, however, or for the hip and other splints which he employed, *as Hugh Owen Thomas would have been.* In those days, the Balkan suspension and traction apparatus, which made use of many weights and pulleys, was in general use! Even patients with severe compound

fractures of the thigh and leg, were put up in the Balkan frame with weight and pulley traction which did not coordinate with the traction in the splint (if any), and some even had traction and support with weights upon skeletal fixation devices in the bone which were used with no supporting or immobilizing splint whatever. This caused confusion, especially among the new surgeons coming in, so that often poorly fitted Thomas splints were put on. Also weight and pulley suspension and traction alone were used in an effort to maintain limbs in correct length and position, when plaster-of-Paris or an efficient Thomas splint was required! A factor that complicated the situation was the frequent irrigation of wounds by Dakin or other antiseptic solutions, or other frequent changes of dressings as they were being done in those days!

One saw in Great Britain under the supervision of Pearson and Sinclair a more careful use of the Thomas caliper splint. Major Maurice Sinclair secured results which were very satisfactory, and, superior to those generally obtained. Major Sinclair's own fitting and application of the Thomas splint was instructive and satisfactory. *If his instructions had always been followed,* the use of weight and pulley suspension and traction in the Balkan frame might have been a contributing factor to the comfort of the patient. As suggested, the attempt to use the splint, and weight pulley traction at the same time, was too complicated for surgeons who were not familiar with the use, either of the splint or of the Balkan frame. The result was that in many hospitals the ideals of Thomas for the protection of the patient in correct position, and against muscle spasm, were never even approximated.

During, and immediately after World War I, I

began to insist upon a more general use of fixed traction. I demanded this both for the Thomas splint, when it was employed, and especially for skeletal fixation in plaster-of-Paris casts, which I very much preferred. I even went so far as to urge that all weight and pulley traction in the treatment of fractures should be abandoned.

Now I feel that *we have gone beyond that point,* and that *there is no excuse whatever for weight and pulley traction.* This as Thomas said is as likely to cause muscle irritation or spasm as to relieve it. One cannot produce stronger arguments than those proposed by Hugh Owen Thomas himself! He made it perfectly clear that the contest between spasmodic irritated, and contractile muscles, and weight and pulley traction, is always a bad thing for the patient. Many of the devices (properly termed "gadgets") which are being manufactured and sold to an unsuspecting surgical profession are inefficient for the same reason. The criticisms that Thomas directed against the "American Method" apply to the weight and pulley treatment of fractures and joint disease by "gadgets" which Thomas himself had tried and rejected seventy-five years ago (see Chapters I and IV). During both World War I and World War II so-called "improved splints" were often devices which Thomas had himself improved upon and handed down to us in their present form. Any apparatus which allows movement, which has to be changed and adjusted frequently, or especially which the surgeon does not know how to use should be discarded without even trying it on the patient. *This was Thomas' own point of view as indicated:*

At Liverpool, on July 24th, 1839, in an address on surgery to the members of the British Medical Association, Mr. J. H.

James of Exeter, introduced to the notice of surgeons new details of treatment appropriate to the restoration of fractures. This was the first important and really valuable addition to the appliances used in treating fractures and diseased joints. Mr. James's method possessed several points of merit—improved method of extending and counter-extending a limb, diminished friction of limb on its line of support, and less compression of the part injured. I think that to Mr. James is really due the credit of giving an impetus to the series of lesser improvements which has since been added to our practice.[1]

Referring to *non-union or delayed union* in fractures, Mr. Thomas said:

During the early part of my practice I invariably interfered with the instances of delayed repair by either rasp, saw, wire or pegging operating, upon an average, on eight to ten cases annually; but during the last ten years I have better succeeded without direct interference, although most of the cases submitted to treatment were less hopeful of success than any of my earlier cases. My change of opinion and practice commenced in March, 1874. My views on the treatment of delayed union first appeared in the *Liverpool and Manchester Surgical Reports,* issued 1876.[2]

With regard to the *open treatment* of fractures, the pendulum has swung back and forth several times since then. Sir Arbuthnot Lane (1914) certainly had much to do with the present demand for more accurate reduction and better fixation of fracture fragments. And Albee (1915) added greatly to the technique of direct fixation by his bone graft methods. *But thousands of the imitators of these authorities would have been better off with Thomas' advice—correct position and immobilization "enforced, uninterrupted and prolonged" —if they could have used his splints.*

[1] THOMAS, H. O.: *The Principles of the Treatment of Fractures and Dislocations,* 1886, pages 10-11.

[2] Ibid., pages 29-30.

For many recent years, with excellent traction devices, pin fixation and plaster-of-Paris, we have found open reduction and direct fixation necessary only occasionally, and, usually, *only for definite fracture complications requiring operation otherwise.*

An example of Thomas' early use of the treatment, referred to elsewhere as the "Bier hyperaemic method" (artificial or induced local congestion) follows. Thomas used this "principle" by percussion and damming upon numerous occasions—at least once to enlarge an outer femoral condyle in a case of recurring outward dislocation of the patella.

Case 26.—J. T., Ffynon Graig, Devil's Bridge, South Wales, presented himself for treatment with an ununited fracture of left humerus, caused by a "chaff cutter" driven by water-power. The injury occurred nine months prior to his interview with me, January 6th, 1879. An examination of the injury made it doubtful whether the fractured points were in absolute contact. However, with this ill-omen, the operation of percussion was performed and repeated weekly for four weeks. The percussive force employed being only a moderate one, I also daily practised "damming," for half-an-hour, the circulation around the fracture, so as to hinder subsidence of the tumefaction caused by the percussion. He was under my observation in hospital four weeks, during which period much progress was not observed. I applied no mechanical fixation beyond a sling around the wrist and neck,[3] which I requested him never to disturb until advised by me to do so.

In this instance I did not administer an anaesthetic during the several operations, as the force used was easily tolerated, and I thought it desirable to operate often rather than severely. On one of the occasions when I was performing the operation, a medical friend, who had often assisted me at like operations, chanced to enter the surgery, and at my request examined the patient's arm, after which he asked if I was going to continue the treatment. On my replying in the affirmative, my friend

[3] (A hanging cast!)

much amused left abruptly. However, as no harm could result by persevering in a thorough trial of this plan of treatment, I persisted. On leaving my hospital, he remained at home a month, and again presented himself, when, on examination, I found some slight improvement. I again made several moderate percussions, and the short periods of 'damming' were continued. After a stay of one week he returned home, coming back again in four weeks, when I found much improvement. The treatment was again repeated, and after another stay of a week, he was sent home with instructions to 'dam' the circulation, daily for half-an-hour, until his return. On his next visit May 6th, 1879, an examination of the fracture showed perfectly sound repair.[4]

Case 4.—On the 18th of March, 1874, I was consulted by one Harry B., of 30, Gradwell Street. This patient was suffering from a fractured leg, in the condition of delayed repair after sixty-five days' treatment. Assisted by my friend Dr. William Kelly, the patient was placed under aether, and the tibia percussed carefully for ten minutes, the skin being protected during the operation with a layer of felt. The percussion was, in this case, followed by a considerable amount of swelling and irritation. The limb was placed in a suitable appliance, and, at the expiration of four weeks, complete consolidation took place.[5]

For some years now there have been attempts to explain union and non-union of fractures in terms of calcium and phosphate chemistry at the site of the fracture. Accurate reduction of the fragments and adequate control are often left out of the discussion by these "fracture chemists" who still do not know either the reagents or the reactions involved in fracture repair. We do know that reposition of all the parts is important for healing as well as for ultimate function and should probably better endure (and use) "the ills we have

[4] THOMAS, H. O.: *The Principles of the Treatment of Fractures and Dislocations,* 1886, pages 40-41.

[5] Ibid., page 31.

then fly to others that we know not of." Mr. Thomas goes on to say:

My practice has given me many opportunities of verifying this, and I am satisfied that the *early removal of restraint* [6] in cases of Colles's fracture will not lessen the evil nor shorten the period of recovery, and their treatment by an exceptionally short period of unsoundness in the carpal joints, which must increase the tendency to anchylosis. Indeed, in fractures of the radius, recovery with permanent defect of motion at the carpal and phalangeal joints has happened, though there had been no surgical rest employed. As, for instance, when the injury has not been diagnosed nor treated.[7] (That is, properly reduced. H.W.O.)

It is not an uncommon occurrence for a surgeon to be asked to restore the symmetry of a fracture of the lower end of the radius four or five weeks after the occurrence of the injury. I believe that this is not always possible after the second or third week without the surgeon's supplementing his manipulations by using the 'Talipes' wrench' or some such leverage. By such extra means the surgeon can often restore normal symmetry, to a neglected fracture, some weeks after the accident. The lever and the mode of using are shown in Fig. XI, 1 and 2.

Dr. Ridlon has told me how Thomas, with a partly concealed wrench in his hand would sit down beside a patient in his outer receiving room—and, in a matter of seconds, with no anesthetic, convert a malunited lower end of the radius into a normal looking wrist.

Dr. Henry B. Thomas of Chicago, has related another version of this story:

[6] Enthusiasts for early motion and ambulatory treatment, please note. (H.W.O.)

[7] THOMAS, H. O.: *Principles of the Treatment of Diseased Joints*, page 24.

[8] THOMAS, H. O.: *Fractures, Dislocations, Diseases, and Deformities of the Bones of the Trunk and Upper Extremities*, 1887, page 119.

In the operating amphitheater at Liverpool with Dr. John B. Murphy and Dr. A. D. Bevan in the audience, Sir Robert Jones introduced a procession of three such cases, all anesthetized and showed the little Thomas clubfoot wrench with which he proposed to restore the deformed wrists to normal contour.

Said Dr. Bevan to Dr. Murphy, "I'll bet you ten dollars he can't do it."

"Done," said Dr. Murphy.

Fifteen minutes later as the third patient rolled out of the theater in correct position on a splint, Dr. Murphy collected his bet.

These malpositions and malunions should not occur, but, if they do, their reparation *should never be neglected by an orthopedic surgeon.* Even after sound bony healing a subcutaneous osteotomy and leverage will often give an excellent result.

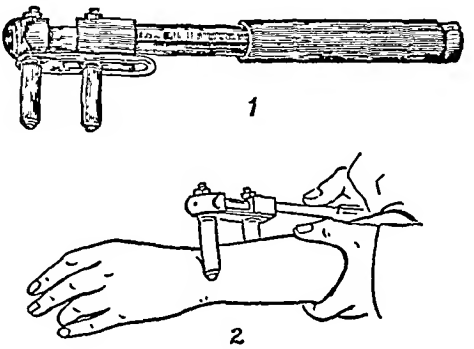

Fig. XI. (1) The "Talipes lever." (2) Restoring the normal symmetry to a neglected Colles's fracture. (From Thomas Hugh Owen: *Principles of The Treatment of Diseased Joints,* H. K. Lewis, London, 1883.)

While Mr. Thomas' writings are full of technical details as to the conduct and care of the patient, the making and application of particular kinds of apparatus and the like, he often reminds us that the care of any

patient calls not for this or that particular item or detail, but, a program in which the principle of rest for the damaged part and the patient should always be uppermost in the surgeon's mind. Mr. Thomas writes:

> The foregoing is an epitome of my own experience derived from observation of trained and untrained practitioners while treating these fractures. I watched for many years the extensive practice of an untrained gentleman, (his Father) and, to do him justice, record here that he never failed to secure a perfect restoration of these fractures, and, if I were to say that I observed his treatment of two hundred cases, I should be vastly under-estimating their number; yet his treatment, guileless of anatomy, was only thorough reduction and reasonably applied counter-pressure. In the management of fractures of the lower end of the radius, several errors of treatment may happen. *First,* imperfect reduction. *Second,* use of the limb being permitted, after complete reduction, before the fracture has thoroughly consolidated.[9] *Third,* when the force producing the fracture further expends itself upon and has injured the carpal bones, and use is permitted before their articulations are sound. *Fourth,* the limb not correctly slung. As regards the first error, *imperfect reduction;* some cases are presented to us with no deformity, requiring very little, perhaps no manipulation; others, with obvious deformity, are reducible by very slight extension; but the majority of these fractures require special manipulation if we wish to reduce them thoroughly, instantaneously and with little pain.[10]

[9] Neglect in the post-operative or after-care in the treatment of deformities and fractures has been a fault even of many great surgeons. Professor Syme of Edinburgh, the outstanding teacher of surgery of his time, adopted subcutaneous tenotomy for talipes equinus—at the suggestion of Stromeyer—but turned his patients out to walk on their crippled feet without splints. At the same time Stromeyer, Delpech, and Little were all urging the importance of post-operative splints and stretching to prevent recurrence of the deformity. (H.W.O.)

[10] THOMAS, H. O.: *Fractures, Dislocations, Diseases, and Deformities of the Bones of the Trunk and Upper Extremities,* 1887, pages 114-115.

Sir Robert Jones had many comments as famous in their way as some of the epigrams of Mr. Winston Churchill (whom Sir Robert resembled in some respects). For example, in dealing with wrist fractures,

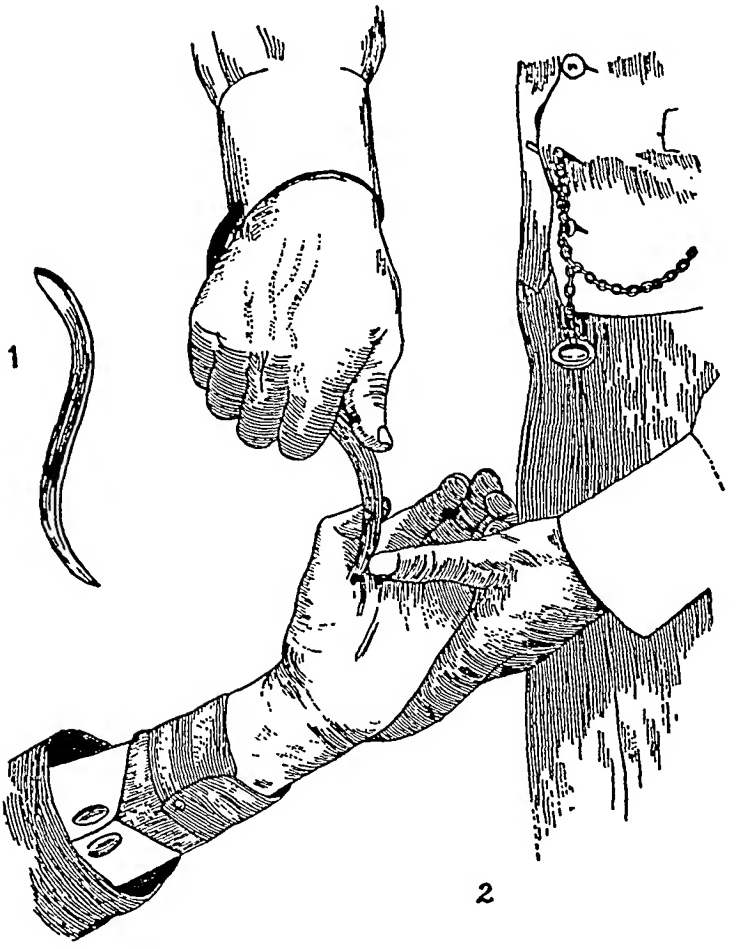

Fig. XII. (1) The lever. (2) Reducing by leverage an otherwise irreducible dislocation of the first phalanx of the thumb. (From Thomas, Hugh Owen: *Principles of The Treatment of Diseased Joints*, H. K. Lewis, London, 1883.)

and with many other hand, wrist and forearm injuries, Sir Robert said:

Partially or completely supinate the hand and dorsiflex at the wrist, then put in splint, cast, or sling, in a position *so that the patient can spit into the palm of his hand.* (An injunction that was difficult to forget.)

Before closing my contributions to the elucidation of some questions relating to the theory of treating fractures and dislocations, I shall relate to my readers my experience in relation to the so-called spontaneous fractures of bones and the clinical aspect of malignancy in bones. Although my practice has not been a specialty, nevertheless a great portion of it consisted in the treating of fractures and dislocations. The spontaneous fractures I have observed, may be, for convenience, divided into two classes: those in connection with malignant disease, and those not connected. For many years when meeting with an instance of spontaneous fracture, I always prognosed the development of malignant disease of the bone, and it did happen that my judgment was verified; but gradually, as my field of observation became extended, exceptions were met with, so that out of three instances of spontaneous fracture of a bone, one would not be malignant.[11]

In all his dealings with "unsound" and injured extremities, Mr. Thomas displays what one might call an "artistic appreciation" as to the appearance of the part when it is "out of order" and when it has been "resolved." Now, it is common custom to rely upon the x-ray—even during operation—to guide displaced parts back to normal relationship. One may see extensive surgical trauma and exposure of operative fields to contamination in attempts to harness the x-ray, mechanical devices for direct fixation of fracture fragments, and the surgeon's instruments, hands and head

[11] THOMAS, H. O.: *The Principles of the Treatment of Fractures and Dislocations,* 1886, page 79.

into a team for such an attempt. To carry the figure a bit further, one observes some of the horses with their legs over the traces or even headed the wrong way instead of being kept under the best control for a steady pull in the right direction.

In *Fracture of the Lower End of the Tibia and Fibula Involving the Ankle Joint, Commonly Termed Pott's Fracture,* Mr. Thomas says:

> The defects of restoration after repair of Pott's fracture are scandalously frequent, but pardonable on account of the deficiency in our training for their management. Like Colles' fracture, this injury cannot be satisfactorily restored if an intelligent supervision is not exercised during the whole of the treatment; it is not at all a question of splints. The replacement after accident may be excellent, but the splay (which we call pronation) outwardly of the foot, characteristic of the injury, with or without some posterior luxation, may be allowed to recur during the two or three weeks of after-treatment, yet at this period it may be corrected by judicious pressure.[12] The surgeon may make a perfect initial replacement, and maintain it so, up to the sixth, seventh, or eighth week, or even longer, until he, by manipulation, judges the part firm, nevertheless, soon after the patient has exercised his foot, the weight of the body brings about some degree of ankle valgus, which more and more cripples him, consequently, an excellently managed case, may finally show a defect of restoration, a blemish which mars its utility.[13] A defective restoration following a Colles'

[12] See Thomas' "outside iron, inside ankle strap and inner wedge on the heel of the shoe." Fig. XIII, p. 142.

[13] Sir Arthur Keith recalls our attention to the point that Sir Arbuthnot Lane had the mechanism of the entire lower extremity in mind when he first proposed open reduction and direct fixation of the fragments in a fracture of the leg. Lane had long studied both structure and stresses in bones and joints. Changes in structure and function due to occupations and injuries had engaged his attention while he was still a teacher of anatomy and before he became a surgeon. He was always concerned, therefore, about the exact restoration of both form and function after fractures that →

fracture, is seldom more than a question of symmetry. It is not so in Pott's fractures, as invariably there is with it a feeling of weakness in the foot, from the fact that the superincumbent weight of the body is frequently testing it. The treatment is not a question of splint, but of intelligent and constant watching, the surgeon may have, by counter-pressure, to remodel according to the deviations outwardly or inwardly of the foot from its normal position in relation to the leg.[14]

The shoe (or boot) with the elevated inner edge of a long heel (Thomas heel) and an iron on the outer side of the leg from below the knee to the outer side of the heel, and an inside supporting strap just below the internal malleolus and buckled on the outer side of the "outside iron" is ideal and entirely effective in preventing or relieving such a pronation whether traumatic or paralytic.

Having now pointed out the defects of the various types of machines in use, (my) conclusions (are) the result of long observation assisted by the criticisms of the sufferers. Now, will be introduced to the reader, a mechanical appliance for the treatment of fractures of the lower extremity, which has not the faults of its predecessors.[15] First, defecation is easily performed without nurse assistance. The patient is not confined constantly to any particular part of the bed; extension of a fixed character can be exercised to any amount in a line with the bone fractured; or this can be arranged to suit the prejudice of the surgeon, who might incline to a continuous rather than a fixed mode of extension.

← would enable the patient to go about his former occupation without making entirely new and different demands upon the structures in the vicinity of an injury. That this kind of treatment is always an important contribution also, to the restoration of physiology for repair should always be kept in mind. (H.W.O.)

[14] THOMAS, H. O.: *Principles of the Treatment of Diseased Joints*, pages 41-42.

[15] Thomas. Caliper.

Here again I think it is desirable to present the caliper splint in these words. *To follow Thomas in his decision to use such a splint for a certain patient; to follow him into the shop as he selects the parts, adjusts them for the patient; has them put together and applies the splint is a novel experience; and, would be even for an orthopedic surgeon of the present time.* However, many patients would be better served if the Thomas routine were oftener employed exactly.

The apparatus is shown in detached positions, built up ready for use in Fig. XIV. From the appearance of this machine the reader will no doubt suspect that from it was evolved the knee splint which has found favour among surgeons, as efficient in the treatment of knee joint inflammation. Before proceeding any further with my subject I will enter into the details of the construction, of all the appliances employed by me for the treatment of fractures of the main bones of the lower extremities, also for the fixation of the knee and hip-joint—afterwards proceed to describe their application; and lastly answer the friendly objections, that have been made, in regard to their construction and use.[16] The component parts of the fracture carriage are depicted in Fig. XIV (see also Fig. XIII and XV).

There are two cast-steel rods with an eyelet at one end of each. The ovoid cast-steel rings, have two bosses or swellings at each end of their major axes. The rings are constructed to open, having male and female connections, being an imitation of the conjurors' rings. This arrangement enables the rings to be opened, so that the eyelets of the twin bars may be slipped on them and rest, one on each boss.

There is a steel slotted axle, at each end of which are two hand-nuts; between the nuts is seen the iron locking-flap, through the semi-circular end of which there is a bolt and nut

[16] It is important to bear in mind that Thomas was devoted to the principle of rest in correct length and position for all fractures and joint injuries and diseases—and, to the point of great importance that all his apparatus (or "machines") must be kept as simple as possible. Both simplicity and efficient immobilization are much too often disregarded in the "gadgets" of the present day.

which fits into the slot. The locking-flap is loose upon the slotted axle.

There is a foot piece for fractured thighs, with spring hooks for extension, and capable of being adapted to the support of the right or left foot.[17]

Having now described the various parts we will suppose them required for use. *First,* one of the three cast-steel rings is sprung open, the free ends slipped through the eyelets of the two steel rods, and the ends of the ring closed. The surgeon can regulate the angle, between the groin ring and the steel bars, and the whole machine made rigid by screwing up the two hand-nuts, thus jamming the steel rods against the locking-flap; next, the slotted support is attached to the latter; and finally a foot-piece is fixed by the bolt.

This instrument is designed so as to be taken to pieces for the convenience of carriage. Its reconstruction is only a matter of five minutes. Fig. XIII shows the fracture-carriage put together by the surgeon, ready for use on a left lower extremity; the latter will be obvious on looking at the slope of the ring. I have generally confined myself to three sizes of 'groin' rings. These are sufficient for patients from the age of twelve years and upwards. Were the rings welded on to the rods, as in the knee bed-splint, seven or eight sizes would be required. This anomaly is explained by the fact, that the difference between the size of each ring can be increased or diminished, by the surgeon increasing or decreasing the angles which the ring makes with the stems, at the groin.

It was very difficult to show this in the drawing. The rings when in use, are wrapped round with a suitable quantity of tow, or cotton wadding; this again is covered with guttapercha tissue, fastened here and there with a touch of chloroform, or benzole. It is obvious that when we wish to vary the length of the machine, the hand-nuts are slackened, and the slotted axle and flap are moved up or down the rods. This fracture-carriage has another advantage which cannot be shown in an illustration. If an assistant slackens the two hand-nuts a little, the surgeon, by gripping the ends of the two rods at the groin, and giving them a twist to right or left, causes the patient's limb to tend

[17] Slightly modified, this has borne several names, e.g., "the Sinclair Skate."

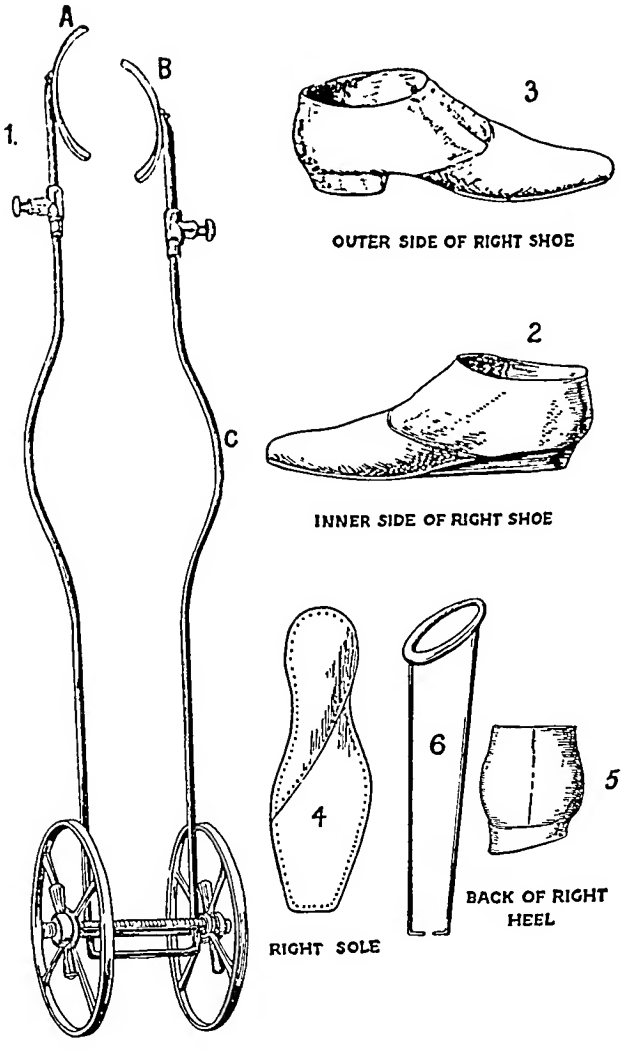

Fig. XIII. (1) Open knee appliance in cases when the knee is so enlarged that the ring of the knee apparatus is too small to pass over it. The B semi-circle is applied to the inner aspect of the thigh close to the groin. The length of the stem can be regulated by the screw; the semi-circle A is to be applied just above the great trochanter, both semi-circles being padded. (2), (3), (4) and (5) Shoes for splay feet before or →

to a rotation outwards or inwards; thus saving the necessity of sometimes having to raise the whole limb from its bed of repose.[18]

The modified Thomas splint with the too-large round ring, with the straight unadjusted side bars, and the notched crosspiece at the lower end designed for "Spanish" windlass traction ropes, and even with the ring "hinged" at the top was made originally, I think, for the "splint teams" who went "over the top" with our men in the trenches—British and American—from 1915 to 1918. *The men and the splints saved many lives in leg and thigh fractures by affording early control and transportation for men who did not have blood plasma and airplanes to base hospitals as we have had in World War II.*

Treatment in base hospitals and in civilian practice, however, with similar splints—not adjusted, without intrinsic or fixed traction, and relying upon weights and pulleys—leaves us far short of the kind of immobilization demanded by Thomas and by Sir Robert Jones while he was still in a position to insist upon the Thomas regime.[19]

Traction was the watchword *then* as it should be *now*. Fixation, whether in splints or by skeletal devices in plaster-of-Paris casts, must presuppose reduction by traction and manipulation or even by open operation if best results are to be obtained. And *best* results are

[18] THOMAS, H. O.: *Fractures, Dislocations, Deformities, and Diseases of the Lower Extremities,* pages 57-62.

[19] JONES, R.: *The Operative Treatment of Fractures,* 1912.

←

after operation. (6) Caliper splint for knee joint. (From Thomas, Hugh Owen: *Diseases of The Hip, Knee and Ankle Joints,* T. Dobb and Co., Liverpool, 1876.)

almost always available to the capable and resourceful surgeon.

Even Thomas was not averse to open operation. *But he gave up open reduction and fixation not only because his precedents' and his own experience were inconclusive, but because he became more competent and expert with his "indirect" techniques as far as fractures were concerned.* Thomas continued:

> All these rectifications can be performed at the bed side.
>
> *First:* to enlarge the groin ring, it requires the application of the cutters of the Vulcan to a mid-point on the anterior aspect of the ring, and with it, to cut through the leather, felt and iron, at one nip, then applying a hand to each side of the cut, grip the ring and open it out.
>
> *Second:* to diminish the groin ring, it requires two applications of the Vulcan to the anterior aspect of the ring, and to cut away a piece from one half to one and one half inches or more, of the anterior aspect of the groin ring, and either by employing a mallet, or both hands, to obliterate the gap made by approximating the severed ends.[20]
>
> *Third:* should one or both rods break during the effort to convert the bed-splint into a Calliper, the surgeon applies to the broken rod one of the 'restorers,' shown in Fig. 50; this can be slipped into its place on the rods, and into the heel of the boot, without taking the covered splint off the extremity.[21]

The mechanism of the Thomas caliper splint is exemplified beautifully by Sir Arthur Keith who, as we might expect, brings *comparative anatomy* to bear upon the problem. Sir Arthur reminds us that crabs and lobsters, instead of having skeletal structures inside their extremities, wear their supports—like Thomas

[20] It was unusual in 1917-1919 to see a Thomas splint in either a British or an American hospital with a well-fitting ring—and it is unusual still! (H.W.O.)

[21] THOMAS, H. O.: *Fractures, Dislocations, Deformities, and Diseases of the Lower Extremities,* page 78.

splints—*on the outside.* That these rigid devices, even on the outer surface of a limb, can be made effective for protection and even permit a certain amount of function (when jointed), no one who has seen (or felt) a crab in action can doubt.[22] As Thomas wrote:

> It generally happens, that the surgeon does not wish any delay in the application of the Caliper, and perchance the patient cannot well afford the luxury of a specially made boot (a much greater expense than the Caliper); the surgeon can, by "translating" one of the patient's old boots, make it as comfortable and as useful as a specially designed one. The mode of translation is as follows:
>
> Having selected one of the patient's old and easily fitting boots, the surgeon, with his pocket-knife, rips the foot's front as far down as the toes, then removes from the posterior aspect of the boot, a triangular piece corresponding to the patient's heel and tendo Achilles; then, if the boot operated upon be a left one, with a centre-punch or a common nail and hammer, he makes an indentation on the outer aspect of the boot heel, rather forward of the centre of its length, and another rather behind the centre of its heel. The indentations are guides to a "Morse twist drill" driven by a common brace, guided in a slanting direction the hole is most easily formed if the indent be placed against a lathe back centre, and the other indent pressed against the revolving drill point, held in a chuck in the lathe spindle, by screwing by the back centre, the drill will run through the heel along the required slant without guidance.
>
> The slot hole allows the formation of either a right or left slant, there being sufficient latitude in the slot for the brass tube to accommodate itself to a right or left rotation; when such a boot is ordered, it is well to let it be designed for use on either a right or left foot, as it may, on some future occasion suit a second patient. If the surgeon desires to secure the extreme of comfort as well as utility, the specially made boot, open to the toes, seamless behind, lateral stiffening only, slotted heel with loose tube to receive the ends of the 'Caliper,' is the best method of attaching a Caliper to a boot. Such an arrange-

[22] KEITH, SIR ARTHUR: *Menders of the Maimed,* 1919, page 52.

ment completely naturalises any rotary friction of the groin ring on its bearing; it also enables the foot to automatically assume the most comfortable slant in relation to the "Caliper." [23]

In a recent paper, (*British Medical Journal,* June 8, 1946, Volume I, page 872) Mr. McMurray *again* reviews the bone-setter antecedents of Hugh Owen Thomas, and explains somewhat more carefully the manner in which Evan Thomas inculcated into his son, the fundamental importance of restoring contour, symmetry, and anatomic relationship to all the parts in an injured extremity. And this was always done as a prerequisite to the application of bandages and splints.

Many of Hugh Owen Thomas' ideas in regard to splint control of these extremities, must have been acquired because of his father's ideals in such matters.

Mr. McMurray also reminds us in 1946, of the unavoidable influence of Syme, Goodsir, and Thomas' other teachers of surgery, in Edinburgh, and London, in leading him away from the necessarily lower standards of practice of his father.

Mr. McMurray's recent paper is particularly a reminder of the adequacy of the Thomas splint as Thomas himself designed and employed it. Although it may be seen from current illustrations, (herewith) that the original splint is employed exactly as Thomas required, it remains a fact, as McMurray points out, that too often (much too often) both in civilian practice, and in the military hospitals of World War II, splints with rings that did not fit, were inadequately and improperly applied, so that treatment of thigh and leg fractures, fell far short of the ideals set up by Mr. Thomas in

[23] THOMAS, H. O.: *Fractures, Dislocations, Deformities, and Diseases of the Lower Extremities,* pages 81-82.

1875 to 1890. To quote Mr. McMurray directly, he says:

In the recent war, the Thomas splint was again used in most cases of fracture of the femur, but, unfortunately its full advantages were not always obtained. In the Royal Army Medical Corps, the Thomas splint was supplied in only three sizes of ring, so that a correct fitting as described by Thomas was, as a rule, an impossibility. With only three sizes of ring, splints in the Army Hospitals were usually temporary makeshifts, which could not give the complete fixation essential in the treatment. The Thomas splint is such an outstanding contribution to the treatment of injuries and disease of the lower limb, that the specifications of Thomas should be followed closely. (Which we have tried to show here.)

Mr. McMurray also calls attention to the fact that *Mr. Thomas designed at least nine other outstanding pieces of splint apparatus.* The fact that he is known principally for his Thomas bed knee splint, and the tremendous service that this splint has rendered, should predispose us in favor of Thomas' other apparatus. Actually, however, Thomas hand and arm splints, his shoulder splints, his below knee double lateral and outside irons, are all used to a much more limited extent than they should be. All these splints, and the reasons for their use, are described elsewhere in these pages, and it is hoped that they will become better known and more generally used than they have ever been.

Dr. Ridlon sailed for Liverpool in 1887, to search for the truth about Thomas' claims (1876 and 1883) as to cures of knee and hip disease by the Thomas splints. *At that time, and for many years after, the orthopedic specialty was largely preoccupied with splints and methods in joint disease.* (In 1893, at St. Louis, Missouri, of thirty-three papers read at the meeting of

the American Orthopedic Association, nineteen had to do with diseased joints.)

Soon after Dr. Ridlon's return, however, he was using the long posterior Thomas splint in fractures of the hip (Fig. XIV). Until Whitman (or Shaffer) adopted the abduction, internal rotation position in splint or plaster-of-Paris, the Thomas splint was the best treatment. Here again Whitman's mechanism of reduction-impaction has been a fundamental contribution to this whole subject. With *a successful reduction by Whitman's method* all other items of treatment: splint, cast, pin, screw, or any other gadget become of secondary importance just so the patient and his limb are kept under control.

Details for the Construction of a Hip-splint, for Posterior Fixation and Support

The most suitable material is first-class wrought-iron, which is very tenacious, and so not liable to break during manipulation. Being made of wrought-iron rather than steel, the splints admit of being modelled by the surgeon (*not* the brace maker!) at the bed side, to the normal contour of the patient. This he does with the aid of a pair of combination wrenches. The hooked ends are employed for rotating the main stem and wings; the movable, bifurcated ends are for bending or unbending the main stem, and closing or opening either of the three cross-pieces.

Most surgeons give instructions for constructing the hip-splint of iron deficient in weight so not sufficiently rigid to prevent tremor of the joint by voluntary, accidental or the unavoidable movements of nursing. The fact that the weight of the splint is carried by the bed, during the painful period, is overlooked; again it is forgotten that the required rigidity of the splint, and consequently its greater weight, is a necessary counterpoise to the disease; further, as soon as the patient is able to leave his bed, a splint that is strong enough, is still an important factor in the prevention of a relapse. A weak 'hip-

splint,' like the extension method of treating hip disease, may have some effect in reducing or restraining deformity, but it certainly prolongs the period of the disease. So far as mere repair is concerned, it would be better if the patient had no treatment. Again a weak hip-splint, like the extension method, keeps the patient in an irksome position, from which he cannot deviate without injury; whereas a properly constructed and fitted hip-machine enables the patient to be handled, even by a "railway porter." [24] (Thomas was wholly consecrated to immobilization in correct position—and rest.)

When it is decided to apply the hip-splint to fractures just below the trochanter, then the buttock bend B. C. is nearly obliterated, so that the machine is almost a straight line from the top to the bottom wing. The essentials of treatment are:

First: To uninterruptedly and as effectually as possible arrest flexion of the hip-joint.

Second: To continue the treatment until the symptoms of genuine repair and soundness of the joint are diagnosed. As with patella fractures, so with these, the younger the patient the longer the period of restraint.

Third: To obtain the best possible restoration circumstances permit, so that no lameness attributable to flexion be a permanent remainder of treatment.[25]

In the fall of 1918, Major Maurice Sinclair had returned from France and, under the direction of Sir Robert Jones, was making a special duty tour of the orthopedic centers in Great Britain. Major Sinclair had made a special study of the suspension and traction treatment of compound fractures of the hip, thigh, and leg in Thomas splints, Balkan frames, hammock, etc., and was demonstrating his methods to those of us on duty at the centers in London, Cardiff, Oxford, Dublin, Liverpool, and elsewhere. The book that Sinclair and Pearson published later, indicated the excellent results that Sinclair was obtaining, and the soundness of his

[24] Ibid., pages 85-86.
[25] Ibid., page 129.

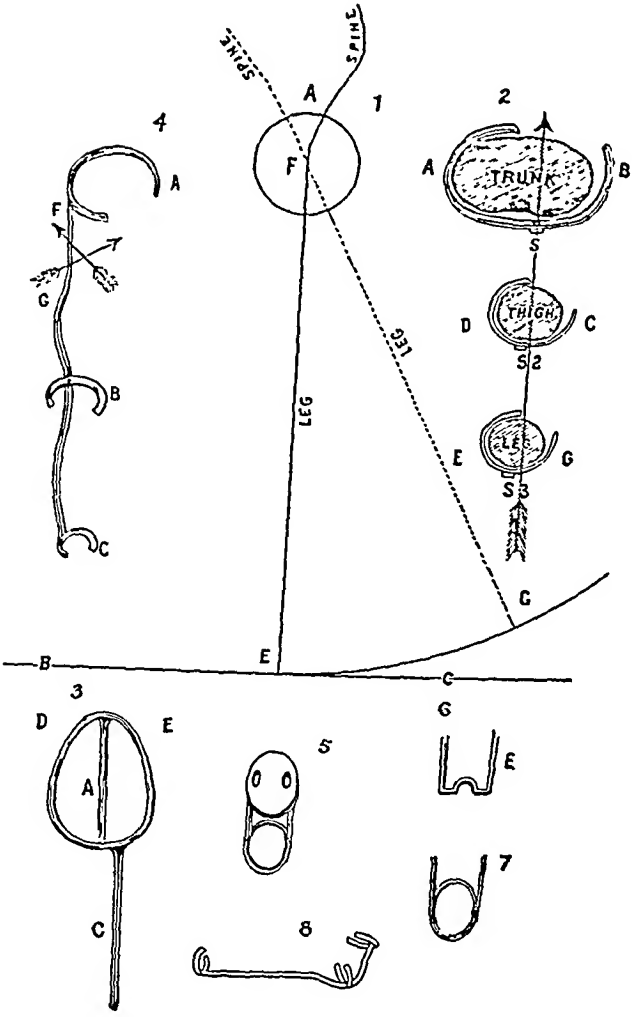

Fig. XIV. (1) Diagram of diagnostic method. (2) Section of trunk and lower extremity showing the application of the hip splint cross bars. (3) Shape of upper portion of knee appliance when not covered with padding. (4) Hip appliance to show rotation of upright portion. (5) Patten for heel in tarsal or metatarsal disease. (6) Staple for retention with knee appliance. (7) Patten end of knee appliance for locomotion. (8) A form of fixation for acute inflammation of the ankle joint. (From Thomas, Hugh Owen: *Diseases of The Hip, Knee and Ankle Joints*, T. Dobb and Co., Liverpool, 1876.)

method when carefully supervised, and directed by experts in this method.

At the time it seemed to me that much less than the necessary amount of control was being obtained as to the immobilization of the injured parts. As it turned out, however, Major Sinclair was making his patients more comfortable, and obtaining better results than the average of the patients we saw otherwise. In those days, every program of traction and immobilization had to be adapted to the supposed necessity of frequent wound dressing. In practically all of our cases at that time, the dressings were being changed once or twice every day and, in most instances the wounds, even into the fracture area, were being irrigated, *if not by the Dakin solution and Carrel technic by some other chemical that the British happened to prefer at the moment!* This seemed, to those of us who were committed to immobilization, to impair the efficiency of the splint, to lose in part the control of the limb, and thus to violate the teachings of Thomas, Jones, and Ridlon, whom we had been trying to follow. Major Sinclair was so careful of his technic, both as to the splints and as to the surgery, that most of his patients were being maintained in full length and good position, and with very little disturbance as compared with most of the weight and pulley methods then in vogue. Following Major Sinclair's visit to our center, and under further supervision of Sir Robert Jones, we did improve our weight and pulley traction, Balkan frame suspension method, so that better length and position were obtained for most of damaged extremities under our care.

It was this sort of thing that those of us on duty in Great Britain, for a year or more, were learning, and that we proposed to carry with us to France, when the

time came for duty in the American Expeditionary Force. Even in those days, my preference would have been for a much wider use of plaster-of-Paris. That was the method I had learned from Dr. Ridlon, and that I have always preferred—up to now. Both the French and the British, however, had been having some difficulties in the use of plaster, especially in those cases for transport from France to the British Isles. Accordingly, the order had gone out from British headquarters that *plaster-of-Paris casts were not to be used for any patient being moved from one area to another, or to the British Isles. The situation in the French hospitals was somewhat the same.* Accordingly, when we took over at Savenay, in August of 1918, we found that the Americans had issued similar instructions. Plaster-of-Paris casts were not to be put on patients, except under supervision in base hospitals, and in no case were patients to be put in plaster-of-Paris casts, or left in casts, for transfer to the United States. As indicated elsewhere, it was soon necessary to have this order changed. We sent several thousand patients, even those with hip and thigh fractures in convalescent convoys from both Savenay and Brest to the United States, and the report from the Surgeon General's office in Washington, was, that *these patients arrived in better condition than those that had been in splints.*[26]

All this goes back however, to the original proposition of Thomas himself, (who used the figure of speech involving *broomsticks*), namely, that the surgeon who knows how to treat thigh and leg fractures can do so, with Thomas splints. But with better technics as to the use of pins and plaster-of-Paris, we suggest that some

[26] See my "Story of the War." (H.W.O.)

improvement has been made upon the inherently insufficient apparatus.[27]

When I visited Liverpool for the third time, in July, 1918, we had been summoned to a conference of the British and Americans on duty in the orthopedic centers by Sir Robert Jones. Many of the Americans had been on duty at London, Oxford, Edinburgh, Cardiff, Glasgow, Liverpool, Dublin and Belfast since June, 1917. There had been two additional American groups assigned during the year to Great Britain for temporary training before being sent to the American Expeditionary Force in France. At Cardiff, Lieutenant Hall and I had been joined by five others and, at other centers, the American groups had been correspondingly increased.

By this time, the British and American orthopedic surgeons had in almost all instances become friends, so that the gathering at Liverpool was a cordial get together, for both professional and personal reasons. Sir Robert Jones entertained us at his home, at 11 Nelson Street, at the hospital, and at the hotel, all in his usual, or perhaps one might say his unusually cordial manner. We even had one afternoon of golf, during which I had the pleasure of playing with Alwyn Smith, John Dunlop, and Eikenbary. There must have been about sixty or seventy American surgeons in attendance, and the formal papers were presented by British and Americans along lines to indicate both *what had been accomplished,* and *what was being planned* in the now entirely successful orthopedic centers which Sir Robert Jones had built up. *It was here that some of us, I am sure,*

[27] Any arrangement involving elastic traction or permitting motion of the injured parts.

had our first real feeling about the Thomas influence, and the Thomas tradition in orthopedic surgery. Sir Robert Jones was always most generous in giving credit to any one, and in Liverpool he spoke in the warmest terms, not only of Hugh Owen Thomas, but also of Dr. John Ridlon of Chicago. Dr. Ridlon had entered the military service in the United States, and was acting both as a consultant in orthopedic surgery, and as instructor at some of the training centers in the United States. He had been anxious to come to Great Britain but, on account of his age, he was unable to obtain permission to do so. Of his work and of his relationship to orthopedic surgery as a whole, Sir Robert Jones was most appreciative upon this as well as upon many other occasions. I wrote to Dr. Ridlon about this meeting, and it pleased him very much to know what was being done as well as what was going on along general lines in the orthopedic surgery of the war.

On my last day in Liverpool, I received from London orders to proceed to duty in France. I had been looking forward to these orders for a long time, but at the moment, they came rather as a surprise. However, I hurried back to Cardiff, got my things together, and the next day was in Southampton, where I was joined by Dr. Kidner, who had been in London. That night we were on a boat crossing the Channel for duty in France.

My first assignment in the A.E.F. was to Base Hospital No. 9 at Chateauroux, my reception at which I wish to mention because it sheds a light on the whole matter of our attempts to interest surgeons, whether orthopedic or not, in changes in their practice. I found at Base Hospital No. 9 in Chateauroux (said to be the best orthopedic center in France) certain methods

of conduct of the hospital and features of care for the patients that had been built up over a period of several months. *There was no one there who had had a special experience in war surgery or who had spent any time in England.* When I proposed certain alterations in the care of the patients and changes in conduct of the wards to conform to our experience in the British Isles, I was met with a very definite rebuff. I was told in almost so many words that they were satisfied with the way things were being done at Chateauroux, and that they did not care to make any changes, especially away from the Carrel-Dakin or splint methods, upon my suggestion. Accordingly, I remained in Chateauroux only about ten days, and was then transferred, at my request, to Savenay, where I was somewhat more independent, and had more responsibility; but that experience is another story.

When I returned to Ft. Des Moines, in the United States, in March of 1919, my experience was the same. There was no surgeon at Des Moines who had been on foreign duty, but they neither asked for nor seemed inclined to accept methods from England or France or alterations of their own. They needed no assistance from those of us who felt that after two years in hospitals in England and France we were in a position to apply some of the "lessons of the war" to the American reconstruction program.

One feature of the recent trend toward direct fixation in fractures of the neck of the femur has been to pin or plate trochanteric fractures as well as those of the neck of the femur. Operations upon cervical fracture, while done much too often, some without even reduction of the fracture and (of course) poor results, have, nevertheless, in other cases "cured" some patients

who might never have walked otherwise. This can hardly be said for the trochanteric fractures. A certain number of such patients—operated upon—have succumbed to complications attributable entirely to the operation. It has been the experience of almost everyone that patients with trans-trochanteric fractures will recover with the most ordinary splinting, or even traction alone. All that is generally required is a reasonable period of good nursing care with the limb in good position to get bone repair.

Notes on Fractures of The Femur's Shaft:

If Aesculapius could be again induced to preside over our art, it is my opinion that his divinity would not enable him to be always a faultless artist, when he had fractures to treat. During the last century, our means towards restoring fractures have been greatly improved; but the ability to always succeed is nearly as far off as our ability to prolong life indefinitely.

Some two years ago, when having luncheon in this town with an eminent surgeon of New York, U.S.A., during the conversation we drifted on to the question of extension in the treatment of fractures of the femur, he maintaining that neither lateral deviation nor shortening could possibly occur if extension was well maintained, my contention was that generally, extension purely, without lateral support, was not trustworthy control over lateral deviation, and that instances would, though rarely, occur where no amount of extension enabled us even to avoid some little shortening. We parted, each holding his original opinion, but circumstances occurred unforeseen by us, which decided the question as between ourselves. A fractured femur was presented for treatment primarily to my friend, and secondarily to myself, sixteen weeks after the injury; decided shortening and non-consolidation, although the fracture was at the junction of the second and lower third of the femur, a favourable situation for efficient mechanical treatment.[28]

[28] THOMAS, H. O.: *Fractures, Dislocations, Deformities, and Diseases of the Lower Extremities,* pages 154-155.

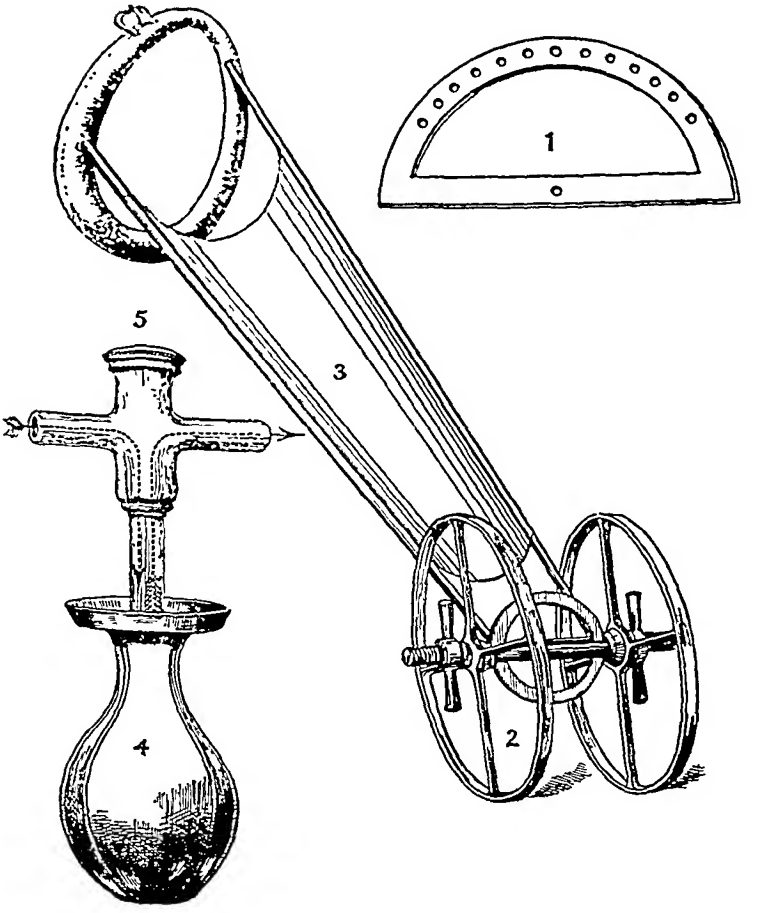

Fig. XV. (1) Quadrant for correcting eversion or inversion in hip disease. (2) Wheel carrier for use in bed with knee appliance to make certain that the posterior aspect of the limb will not come in contact with the bed, as this is often a source of aggravation of pain and other symptoms. (3) Knee appliance. (4) India rubber exhauster. (5) The four-way aspirator. (From Thomas, Hugh Owen: *Diseases of The Hip, Knee and Ankle Joints*, T. Dobb and Co., Liverpool, 1876.)

The Treatment of Injuries to the Neck of the Femur

In the past while treating fractures of the femur's neck, we have made theoretical errors similar to those committed by us when treating fractures of the patella; devoting our energies and thought to the question of their restoration, ignoring that of repair. As with patellar fractures, to improve our results we want knowledge that will aid repair, not better mechanics to gain restoration. The treatment of these fractures has not progressed materially since the days of Sir Ashley Cooper. Surgeons have not since then given this lesion much consideration. To show that this is a fair view of the situation, and not merely my opinion, an editorial on the subject is here reproduced from *The Lancet,* August 31st, 1889.

The surgery of fractures of the neck of the femur cannot be said to be in a satisfactory state. These injuries are very common, and their results are serious. Not uncommonly life itself is lost, and permanent weakness and lameness are a usual result. The progress noted in other departments of surgery has not reached this, and the want of special interest in the subject has no doubt been due to the difficulties besetting exact diagnosis and really successful treatment. The old classification of all fractures of the neck of the femur into intra-capsular and extra-capsular has been pretty generally given up. It is now recognised that, while such a classification may represent the actual facts in a minority of cases, it is inaccurate in the majority, and, further still, it fails to indicate the important and essential differences met with in these fractures.

Instead of concentrating attention on the relation of the fracture to the capsule of the joint, the impaction or non-impaction of the fragments is now laid stress on, and this for an important clinical reason. Impacted fractures, unless becoming unimpacted, are found to unite by bone, and so to be attended with less serious results than the other kind. The great thing to avoid in such a case is any manipulation which can separate the two fragments, and therefore examination of the injured part should always be conducted in such a way that this accident cannot happen.

Latterly, Dr. Senn of Chicago, has been trying to apply this knowledge to cases of unimpacted fractures. He first of all resorted to some experiments on animals. Having made sub-

cutaneous fractures of the neck of the femur within the capsule, he drilled the fragments and fixed them in direct apposition by a steel pin and a bone nail.*

When this was done, firm bony union was obtained. The attempt to apply this treatment to human subjects was felt to be an extreme measure, ill-adapted to the old and feeble patients in whom this accident is generally met; and it has now been shown to be wholly unnecessary, for the same end can be obtained by simpler and milder measures, to which no objection on the score of severity can be urged. The object aimed at is to reduce completely all unimpacted fractures, and to hold the fragments in such firm contact that a kind of slight impaction is produced and bony union obtained.[29]

For this purpose he fixes the limb in its corrected position by a plaster-of-Paris splint carried from the toes up the limb and the trunk as high as the eighth rib, and down the opposite thigh as far as the knee. An interval is left in the plaster cast over the great trochanter, and a pad worked by a screw on a steel arch attached to the splint is applied over this interval. When the plaster is set, pressure is made in the line of the neck of the femur by screwing down this pad.[30] By this pressure the two fragments, which *by the perfect reduction of the fracture have been brought into apposition,* are pressed together, and are held as securely as if they were transfixed by a pin.

In the *Journal of the American Medical Association,* Dr. Senn describes fully this mode of treatment and he details *several* cases in which he has applied it. He recommends that the same means should be employed when the fracture is impacted, as a security against disimpaction under the influence of the rarefying ostitis which accompanies union. Only, in cases of impaction no manipulation should be made to separate the fragments, and no

* Nailing has been done with some measure of success (but much less than perfect) ever since Nicolayson in 1897. But even in September 9, 1946, *Time* magazine reported that after nailing the hip by the Bohler, of Vienna, method, "In a week or two, normally, the patient walks out of the hospital without crutches. U. S. surgeons first heard of the nail when prisoners, released from German prisons, began to turn up with it inside their thigh bones."—*Time,* March 12, 1945. (H.W.O.)

[29] This was, and is, the idea of the Whitman method (1905).

[30] Cotton used a mallet many years later.

efforts made to restore the length of or the position of the limb.[31] By this treatment it is stated that bony union can be anticipated confidently, that patients can be gotten up within a few days of their injury and so avoid all risk of hypostatic pneumonia, and that in many cases complete restoration of the function of the limb can be secured in the minimum of time. In its present form, it seems to be a method that deserves careful trial, and, if in other hands it is found as practicable and as successful as in Dr. Senn's, that enterprising surgeon will have conferred a great benefit upon a large class of aged sufferers for whom surgery has heretofore done but little.[32]

The experiments referred to in the foregoing quotation, convey no new or useful information. Sir J. Lister has performed such an operation upon the human subject. These are experiments in the field of restoration, but the hitch is in that of repair, and Dr. Senn's interpretation of the several cases treated is incorrect.[33]

Mr. Thomas seemed to feel that Dr. Senn's conclusions rested upon too limited a clinical experience.

This discussion of the considerations involved in the diagnosis and treatment of fractures of the neck of the femur, is interesting chiefly because it anticipated many of the things that have been said and done about hip fractures (still called "the unsolved fracture" by Dr. Kellogg Speed) since that time. Thomas was living and practicing in an atmosphere still dominated by the teachings of Sir Ashley Cooper, to the effect that no bony union of fracture of the neck of the femur was to be expected, or could be obtained. That Mr. Thomas had observed bony union in fractures of the neck, where impaction had occurred, is obvious from his remarks.

[31] Shortening or rotation of the limb should be corrected in most cases nowadays.

[32] Mr. Thomas may have subscribed to the above because he had so many poor results.

[33] THOMAS, H. O.: *Fractures, Dislocations, Deformities, and Diseases of the Lower Extremities,* pages 121-123.

That he believed it possible to obtain such impaction, or something approximating it by treatment is also indicated by the methods that he employed. His review of the writings by Dr. Senn of Chicago, showed an open mind with regard to new and better methods of the handling of these cases. Thomas was even willing to go so far as open reduction and nailing, but it had not been proved to his satisfaction, that such treatment was justified in the elderly patient, with impaired vitality, and with the kind of fracture commonly encountered in such patients. (Some recent adventurers in this field have shown less consideration.) He was very much interested in Doctor Senn's proposals, however, and quite willing to go along in some of the methods he proposed. Doctor Senn had approached the whole matter in a rational and careful way, which appealed especially to Mr. Thomas.

These teachings as to reduction, impaction, maintenance of correct position, and immobilization, anticipated except as to technical details the teachings of both Whitman and Cotton. For many of us who have employed the methods of Thomas, later improved and demonstrated to be successful, especially by Whitman, a high percentage of good results has been obtained. A point stressed more by Whitman than by Mr. Thomas, but absolutely necessary is that of primary adequate, and satisfactory reduction. Mr. Thomas does not lead the way in this as Whitman did, but it may be felt that he assumed anatomic reposition, as he always did, to be fundamental to the treatment of the hip along the lines he suggested.

If such reduction may be obtained, whether by the method of Whitman, or by technical methods suggested by any of Whitman's followers or modifiers, then the

first essential for satisfactory treatment has been obtained. Whether then one maintains satisfactory relationship of the fracture fragments and the surrounding structures by immobilization in plaster-of-Paris, or whether one brings about impaction by the methods of Cotton, or whether open fixation by means of pins, screws, or bone graft, is obtained, bony union in a large portion of cases, is to be expected. Careful reading of most of the contributions to the surgical literature of the last twenty-five years will reveal that many surgeons have been trying to treat fractures of the hip, without having obtained reduction as a primary step even in the surgical operation. Immobilization methods all the way from Thomas to the present time are obviously futile if less than anatomic reposition of the fractured parts is secured. It might be remarked also that Thomas' apprehension about additional trauma, and other damage to these patients has often been disregarded in surgical procedures proposed. The danger of operations with extensive destruction of tissue, bony and otherwise, and damage to circulation by mechanical fixation devices, in and around the hip joint, should be given the most careful consideration before any attempt at direct fixation in hip fractures is undertaken. That the general condition of the patient should be given the same consideration as in thyroid, prostatic, and similar major surgical procedures goes without saying.

As to post-operative care there have been occasional operators with so much confidence in their pins or screws that post-operative casts and splints have been omitted from the program. A few patients have even been made "ambulatory" ("what crimes have been committed in Thy name") but Thomas *knew the answer to that one* too.

CHAPTER VII

Comments Upon Methods Still in Use in Orthopedic Practice

From the Writings of H. O. Thomas, Sir Robert Jones, and Dr. John Ridlon

THOMAS OBSERVED and commented upon the beneficial influence of splinting in correct position for shorter or longer periods, following the attack of acute infantile paralysis. Robert Jones elaborated considerably upon the Thomas observations in his book on *Surgery of the Paralyses*, written with Professor Tubby, in 1903. Considering the fidelity with which Thomas, Jones, and Ridlon, all carried out the splinting of these cases, and the consistency with which they protected their patients against contracture deformities, and deformity caused by weight bearing, *it is astonishing that progress has been so slow in the treatment of patients along these lines.*

Attention was directed at different times by all three to the point that patients will recover power in paralyzed and over-stretched muscles, even many months, or even years after the acute attack, if the limbs are

carefully kept in such position that the weak muscles are relaxed and protected for a sufficient period by the application of a suitable splint. Static deformity, caused by weight bearing upon the partially paralyzed limbs, may also be corrected even late after the attack if correct and consistent splinting is employed.

Efforts of orthopedic surgeons since the time of Thomas and Sir Robert Jones have generally been directed toward the protection of these extremities in correct position before contracture or static deformity takes place. Along with this there is an opportunity for the patient to make some use of a partially paralyzed extremity. *This is the most important factor in treatment until the maximum return of power to the affected extremity has occurred.*

It is necessary to remember that the recovery and restoration of partially damaged anterior horn cells in the spinal cord, and the peripheral nerves, has always been spontaneous and progressive more or less, regardless of splints and physiotherapy. Even this treatment, however, has often fallen short of our actual knowledge, and our ideals, both because of the inherent difficulty of such a program, and because of the failure to obtain the largest amount of cooperation from patients, parents, or even physicians engaged in other lines, who have had the primary care of patients with acute anterior poliomyelitis. Because we have failed to make the best use of our knowledge in regard to these matters, we have thus provided the opportunity for partially informed semi-charlatans to exploit hot packs or some other minor technical agent as a cure for infantile paralysis. This sort of thing is in line with our failure to realize the possibilities of the Lister antiseptic method, so that we still have septic infections to complicate our surgical practice.

We have never availed ourselves of all the possibilities of the exclusion of infectious organisms from our fields of surgical operations, nor have we prevented complicating and mixed infections following accidental and surgical wounds inflicted upon our patients. In other words, surgical ideals and, for one reason or another, surgical practice are still at some parts of the score playing upon different instruments and very much out of harmony.

Mr. A. H. Tubby of London, and Robert Jones, in 1903 indicated their thorough appreciation of the principle of protection of paralyzed muscles by the use of posture, splints and muscle control in the following program for the care of a patient with a poliomyelitic disability of the arm:

In this condition power may often be restored to the biceps muscle. The wrist should be placed in a simple splint so designed as to keep the hand hyper-extended. This is to prevent the otherwise inevitable contracture of the flexors. The arm should be kept in a sling or halter at an angle of flexion somewhat less than 90 degrees.

The object of this is to keep the biceps relaxed; it should in addition be pretty constantly kneaded. This offers the only chance of recovery to the biceps. *During treatment care should be taken not to allow, even on one occasion, extension of the arm.*

Once the slightest trace of power can be discovered in the biceps, a successful result may be certainly awaited. Eighteen months or two years of active treatment are needed at least. Should the sling be removed too soon, the biceps will again be stretched, and for a few weeks will not respond to any voluntary effort. *This proves the correctness of the Thomas theory of muscle-shortening.* The clinical test of the recovery of the biceps is the power of voluntary movement of the arm from its flexion angle to a point nearer the chin. This can be tested without removing the sling.

To develop the power of the biceps should be the surgeon's

main aim, and the patient should constantly be urged to lift his hand to his mouth. The test of recovery of the extensors is the power to hold the hand in a hyperextended position when the splint is removed. The arm and hand should be secured at night-time for a considerable period, and restraint even during the day should be very cautiously removed.[1]

Again on pages 91, 92, a similar program conforming exactly to the same principle is described. (Remember that all this was written almost fifty years ago.)

The principles[2] of treatment of the paralytic condition of the knee are as follows:

1. To ascertain the condition of the muscles around the knee, as to their retention of contractile elements. This is best effected by testing with the faradic and galvanic currents.

2. To rectify any deformity of the knee, such as lateral deviation or flexion.

3. To stimulate the muscles to renewed contractility if any active tissue remains.

4. To supply an apparatus, simple and inexpensive, which will bear the body weight during locomotion under the control of the psoas and iliacus muscle. For this purpose no apparatus is so suitable as Thomas' calliper splint provided the ring be made at the proper shape and at the proper angle. It is much more effective than complicated apparatus requiring pelvic girdles or shoulder straps. (Note this! I usually eliminate all knee and ankle joints from such apparatus. H.W.O.) No joint should be placed at the knee, so that the quadriceps muscle should not be stretched; but if the paralysis has been remedied by muscle-grafting, a simple joint may with advantage be introduced. The terminals of the calliper should be placed in the heel of the boot so as to give aid in maintaining the rectified position of the foot.

Thomas' own remarks in regard to this—twenty years earlier—follow:

[1] TUBBY, A. H., and JONES, R.: *Modern Methods in the Surgery of Paralysis,* page 60-61.

[2] I should amend this by saying that the "principle" involved is protection and use in correct position.

Much can be done to make these limbs really useful. In previous pages, the operative and mechanical treatment of the non-congenital forms of talipes have been reviewed; among other items of treatment reference was made to the mode of preventing the over-correction of talipes equinus—also reference was made to 'barring' the shoe for the prevention, sometimes noticeable, of a tendency, even after operation and excellent correction, to a return of the primary defect (drop foot). Should the surgeon not find the bar shoe to be sufficient leverage towards hindering the return of the defect; then by locking the knee-joint with a 'Calliper Splint,' very much more leverage power is brought to bear upon the tendo Achillis.[3]

But now we may go back another twenty years (eighty-two years ago in 1948) and find that Thomas was thinking in terms of relaxation and protection for weak muscles in the early years of his practice.

To always treat a dropped wrist-joint expeditiously, and in some cases, if we wish at all to succeed, we must so apply our mechanical fixation that the hand and fingers are kept posed in relation to the forearm in the form of extreme extension, so held as to allow the muscular tissue of the extensors of the wrist and fingers to retract from the overstrain, and further, it must be so attached to the limb that the nutrition of the muscle is not interfered with, by allowing it to suffer from any compression which hinders contraction and tends to maintain the original defect—the overdraw. Having thus correctly applied certain principles,[4] the surgeon has not omitted anything that can forward the cure, and has only to await his reward.[5]

During the autumn of 1866, my friend Dr. Burrell[6] of

[3] THOMAS, H. O.: *The Mechanical Treatment of Sequelae to Paralytic Lesions Affecting the Lower Limbs,* 1890, Part VII, page 159.

[4] Now Thomas is really discussing principles! H.W.O.

[5] THOMAS, H. O.: *Fractures, Dislocations, Diseases, and Deformities of the Bones of the Trunk and Upper Extremities,* pages 122-123.

[6] Dr. Burrell was made an honorary member of the American Orthopedic Association in 1889. He died in 1910.

Boston, Massachusetts, visited me and we spent a couple of days together in mutual exchange of information and in making clinical observations. Out of many cases observed we examined a case of 'dropped wrist,' which had been under my treatment seven weeks. On my methodically withdrawing the appliance, we observed that the patient had regained voluntary power of extending hand, wrist, and fingers, which he was able to perform perfectly but very slowly. We decided that the treatment should be discontinued. Dr. Burrell inquired of the patient, how long the defect had existed before I had commenced the treatment and, to my astonishment, the patient replied, 'Seventeen years!' This fact I had not recollected and I doubt that the patient had ever informed me of it. It caused us to reverse our decision and, instead, to continue for a few weeks longer as a matter of precaution only. After further questioning the patient we learned that he was a native of Warrington, and that the defect had existed since he was two years of age.[7]

Mr. Thomas made his usual rational approach to the treatment of spinal curvature. Here he was dealing with a mechanical problem, with physiological factors involved, of course, but subject to guidance by one familiar with the laws of adjustment and growth. So, his suggestions, based upon his own work and study of the efforts of others led him to methods not too different from those of one of our own most enlightened orthopedic clinicians and teachers,—Steindler and the "Compensation Method." In Mr. Thomas' writings we find:

The Treatment of Spinal Deformities

I am convinced, as Roth also maintains, that for the treatment of lateral spinal curvature, unconnected with disease, mechanical appliances are worse than useless, as they restrain muscular development, and do not, in the slightest degree, correct the

[7] THOMAS, H. O.: *Fractures, Dislocations, Diseases, and Deformities of the Bones of the Trunk and Upper Extremities,* 1887, page 124.

deformity.[8] There appears to me to be only one method that may keep the spine straight or lessen an already formed curve; to maintain the pelvis horizontal, by correcting the unequal lengths of the lower extremities, which is best done by adding so much more height to the heel, or heel and sole of the boot of the shorter extremity, increasing the height from time to time, until the adult period of life is arrived at when the patient can elect to continue the supplement, and have the spine straight, or to diminish it, and be content with such a degree of lateral curvature that may not be readily observed when he is clothed. This plan, I am convinced, is the only rational method as yet proposed of treating these deformities.

The daughter of a Mrs. B., had been for many years under the treatment of a metropolitan specialist, and was almost encased with steel supports around the trunk and extending to both lower extremities. Surgeon A. requested Mrs. B. to revisit him and bring her usual medical adviser with her. At this interview the two surgeons coincided in opinion and explained to the parent their views of the requirements of the patient, after which, the armamentaria were discarded, a few slips of leather added to the young lady's boot and the desired effect was gained.[9]

Dr. Ridlon was not impressed with the work of Mathias Roth (1819-1891) or his son, Bernard Roth (1852-1915). He thought they treated too many patients too casually. Paul Bernard Roth (1882-) was very kind to me when I was in London in 1929.

[8] I had the advantage of having a demonstration, by Dr. Roth, of his method of developing the muscles of the trunk, and it is my opinion that his system of treatment must answer the purpose aimed at, as by it the deformed skeleton becomes better covered, so that an already formed defect is less noticeable and less felt by the patient, and the extra muscular power developed by this treatment enables the patient to undo while in the sitting position (as the pelvis is then horizontal) the compensatory curve consequent on long standing with the pelvis, supported by two props of unequal length.

[9] THOMAS, H. O.: *Fractures, Dislocations, Disease, and Deformities of the Bones of the Trunk and Upper Extremities*, 1887, pages 16-17.

Referring to adolescent osteoarthritis as well as to Pott's disease or destructive disease of the vertebrae, Thomas said:

To the treatment of posterior curvature of the spine I can contribute but little. The mechanical treatment adopted by me is that form of posterior support which my friend, Dr. Bauer of St. Louis, U.S.A., had introduced into practice and unfairly termed it 'a DORSAL cuirass'; unfairly, because it is a most efficient lumbar, as well as dorsal, support, it is in every way an excellent mechanical aid in disease of any part of either the dorsal or lumbar portion of the spine. It is a stay to the sufferer if walking or sitting, and an unvarying shaped bed to recline upon; and by it we reach the highest and lowest points of leverage, and assist the respiratory act, leaving the chest free for compensatory expansion and the abdomen free to assist respiration. It covers more length of the spinal column than any instrument which has been, up to this date, made known to us. Indeed, when it is supplemented with groin straps, as when the disease is situated low down in the lumbar spine, it will check the patient, even when using a muscular effort to do so, from stooping forward and touching the ground—a very important advantage when we have to treat thoughtless children. It also has another very important merit; it can be gapped to avoid pressure on any projecting deformity of any portion of the dorsal or lumbar spine, and it can be bridged to allow continuous drainage from a sinus opening in either the groin or lumbar region.

Whilst maintaining the opinion that Dr. Bauer's 'dorsal cuirass' is the best mechanical aid of all the posterior supports, we know of, I am equally convinced that the plaster-of-Paris casing, now so popular, is the most inefficient and irrational of all forms in use, and is of but very partial assistance to the sufferer.[10]

This is quite obviously one point upon which Thomas failed to impress Dr. Ridlon. When I began my training in Chicago I was instructed personally by Dr. Rid-

[10] Ibid., pages 17-18.

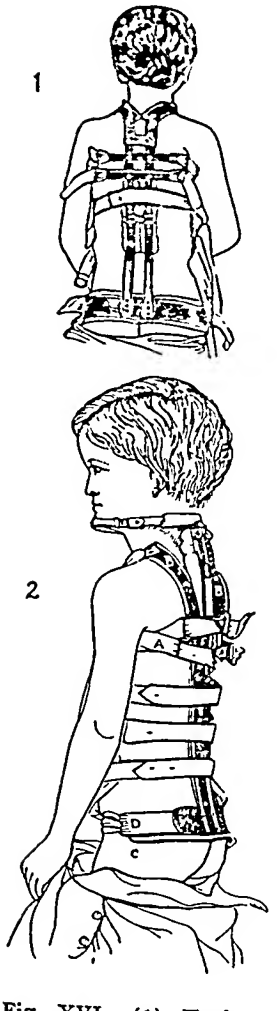

Fig. XVI. (1) Taylor's apparatus for Pott's disease. (2) Taylor's instrument for Pott's disease in the neck. In 1874, this was sold by Caswell Hazard & Co. and W. F. Ford of New York, for $30 to $50.

lon not only in the indications for, and the methods of, applying body casts, hip casts, body and shoulder spicas, but in the technique of making bandages, and in the after care of all patients in plaster-of-Paris casts and splints. It was not just "putting on a cast" but the application of an efficient immobilizing apparatus, just as Thomas used his splints, to protect diseased parts or to maintain injured, diseased, or corrected deformities in position for maximum function when the patient's treatment had been completed. And Ridlon used plaster-of-Paris with better eventual results, I think—than Thomas and Jones, and especially their pupils, ever got with the Thomas splints.

The following from Ridlon and Jones indicates that, in Pott's disease, in 1899, the Bauer Cuirass, or something like it, was still in favor with Robert Jones. But only about five years later, in Chicago, I found Dr. Ridlon using plaster jackets and a spine brace "modified" slightly from the one usually called the Taylor brace.

Should the deformity be an extensive one and the angle formed by the spines of the diseased vertebrae be acute, one or both of two procedures may be necessary. The leather between the frame and over the kyphosis may have to be split, so that no pressure is exercised over sharp projecting bone; or, in addition, a bar of iron may be so placed over the projection so as to render the recumbent position easy.

In exceptional cases, when the superincumbent spine falls considerably forward, traction is made by the shoulder-straps toward the cuirass, which in such cases, in order to allow of a pull, is not fitted accurately to the upper portion of the back. In lumbar disease, or when there is psoas-contraction, a leg-piece is added, ending close above the knee,[11, 12] to prevent movement of the limb and traction upon the vertebrae.

One of us (R. J.) uses this support largely.[12, 13]

Treatment of Spondylitis with the Thomas[14] Cuirass

The treatment of Pott's disease by this appliance is based upon the principle of immediate and complete immobilization of the diseased area by an apparatus applied in most cases to fit the deformity, without any effort then, or at any time, to correct the deformity by suspension, posture, and only very exceptionally, by leverage. The principle logically obtains from the theory that a diseased joint recovers quickest when subjected to immediate and complete immobilization, and receives injury from, and is delayed in its recovery by, each successful attempt at correction of the existing deformity.[15]

For weakness, injury, or disease in the neck or cervical region of the spine, Thomas devised a simple padded "collar" which is still used by orthopedic sur-

[11] See Fig. XIV, No. 4.

[12] During the past few years this has been called the "Risser method."

[13] Ridlon, J., and Jones, R.: *Lectures on Orthopedic Surgery*, 1899, page 101.

[14] Thomas himself attributed this to Bauer!

[15] Ridlon, J., and Jones, R.: *Lectures on Orthopedic Surgery*, 1899, pages 95-98.

geons "in principle" everywhere. From the following description in Ridlon and Jones it may be observed that what is now commonly called the Thomas Collar is a careless makeshift that seldom fits as well, rarely keeps its shape or provides anything like continuous support —even if worn consistently—*which it almost never is!*

> The Thomas collar, for use in disease of the cervical portion of the spine, is made by cutting from a piece of sheet-metal, steel, iron, aluminum, zinc, or tin, a piece straight on one side and convex on the other, long enough to somewhat more than encircle the neck; at the ends it should be wide enough to reach from the base of the neck to the base of the occiput, and in the middle wide enough to reach from the sternum to the chin. It is bent to roughly fit the neck; then the edges are turned slightly out, and the whole is wrapped in felt and covered with sheepskin. At the ends, a buckle and strap are attached, or two rings, so that the collar may be securely fastened around the neck, resting on the chest and shoulders, and supporting the chin, jaw and occiput. This simple device is one of the most satisfactory of all methods for treating cervical caries.[16]

In the old days, every patient and professional visitor to 11 Nelson Street was impressed by the special chair that Mr. Thomas had in the center of his waiting room for the manipulative reduction of shoulder dislocations. The demonstrations of this procedure were well dramatized by Mr. Thomas especially in those late cases in which he engaged the assistance of six or eight strong men from the street or from the docks to pull on the arm or help control the patient while the displaced shoulder was being put back into correct position. That this "show" was not merely a "show-off" is indicated by the discussion and the case report which follow:

[16] Ibid., pages 95-98.

To Reduce a Dislocated Shoulder

To succeed always in reducing dislocations of the shoulder, and to gain a deserved reputation for success in this operation, the surgeon ought to attack the work so that there shall be from

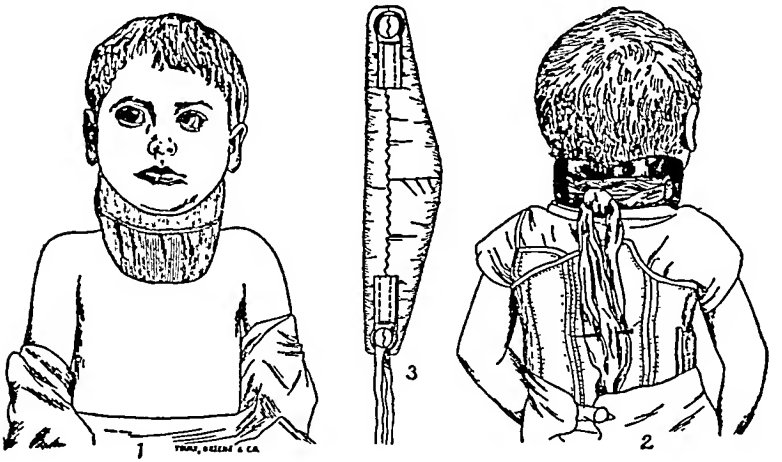

Fig. XVII. The cervical collar. (1) Front view. (2) Back view. (3) Before application.

first to last no interruption of progress, or what appears to the patient a change of tactics and prolonging of pain, involving both a loss of time and of the patient's confidence, which may, if an interval be introduced, cause the sufferer to insist upon a suspension of the proceeding and consult others. The preceding remarks are, in my opinion, worth considering. As the surgeon can build a solid reputation only upon the many consecutive, not isolated, instances of skilfully performed manipulations; consequently, he ought to select the mode of operation which is most trustworthy as apparent from the uniformity of successful results.[17]

The surgeon, finding the existence of a recent dislocation of the right humerus into the axilla, requests the sufferer to sit in

[17] THOMAS, H. O.: *Fractures, Dislocations, Diseases, and Deformities of the Bones of the Trunk and Upper Extremities,* 1887, pages 65.

a chair which is a fixture attached to the floor of the surgeon's consulting room. To the chair is attached a ring crutch, the ring admitting of elevation or depression so that its centre may correspond to the centre of the glenoid cavity. Through this ring the extremity 'A' is drawn until its further progress is arrested by the ring coming in contact with the acromium and chest wall. The surgeon now requests two or three powerful assistants to apply all the traction they can, continuing it for

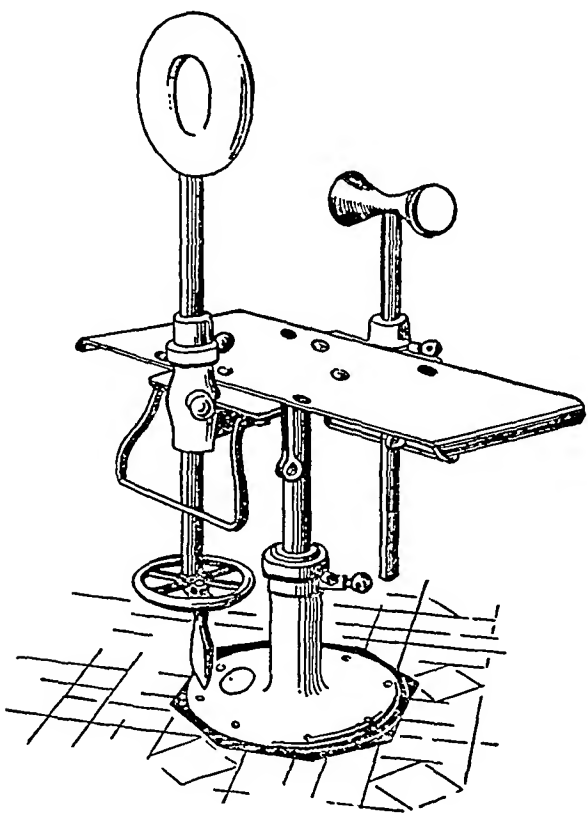

Fig. XVIII. A surgical chair especially adapted for the reduction of dislocations of the shoulder and elbow joints. (From Thomas, Hugh Owen: *Principles of The Treatment of Diseased Joints*, H. K. Lewis, London, 1883.)

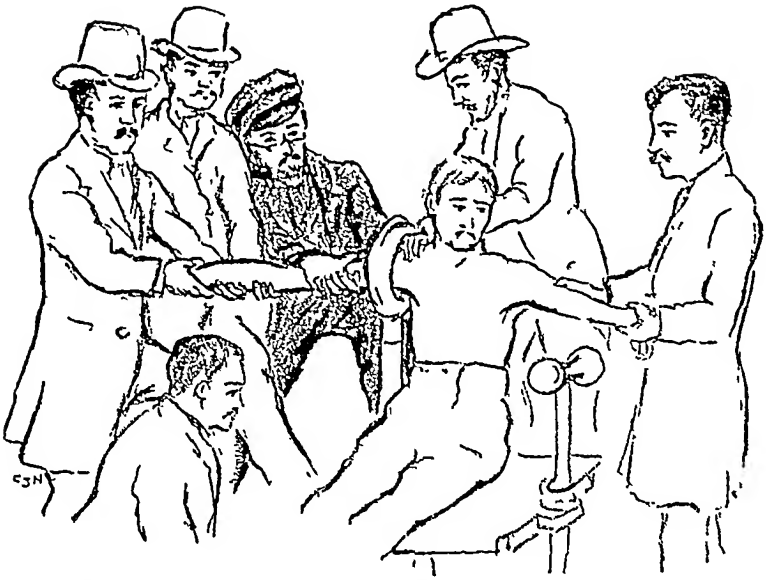

Fig. XIX. Reducing an ancient dislocation in surgery. Hugh Owen Thomas, in the peaked cap, grasps the patient's right arm, while Sir Robert Jones, on the extreme right, holds the patient's left arm. (From Thomas, Hugh Owen: *Principles of The Treatment of Diseased Joints,* H. K. Lewis, London, 1883.)

about half a minute, while the surgeon stands behind the patient with his right hand supporting the head of the humerus and with his left hand pressing the acromion. At the expiration of this half minute he directs his assistants, who are applying unremitted traction to lower the extremity, to give the extremity an anterior and posterior swing motion, so that the head of the humerus may be made to seek for the opening in the torn capsule. This proceeding occupies another half minute. If at the end of the minute, the surgeon, who still has his right hand under the humerus and his left on the acromion, has not detected reduction, he decides to add a little leverage, and instructs his assistants to further depress the extremity, while at the same time traction is well maintained and the swinging motion continued. Now the surgeon diagnoses reduction, and the limb is appropriately fixed.[18]

[18] THOMAS, H. O.: *Diseased Joints,* 1883, page 67-68.

Mr. Thomas had a philosophy and logic for all of his diagnostic and therapeutic procedures. The Thomas heel, the anterior heel, the wedges on shoes and all the inside, outside, and posterior cock-up irons and splints were designed and used to meet certain conditions of weakness, disease, or strain.

Many of the "modified" splints, especially "hinged ring," knee joint, stop locks for elbows and ankles, and that sort of apparatus, intended to afford motion or locomotion defeat the protection and rest that Thomas had in mind.

For the foot conditions following we shall accomplish more in assisting the patient with Thomas' simple devices than, as Thomas expressed it, with "an instrument maker's arsenal."

Normal relationship of anatomic parts and normal external appearance were always in Mr. Thomas' mind. Any shortening, angulation or rotation, he thought should be recognized (*without x-ray in his day!*) and corrected. This defect varies in degree from slight inversion of the foot when in use, to eversion of the foot so that at every step it grinds on the inner aspect of the point of the lower end of the fibula.

His comments in regard to many of the gadgets then and still in use are as follows:

Flatfoot, Splayfoot, Weak Ankles, Talipes Valgus: the foregoing terms refer to four degrees of variation from normal symmetry.[19]

"Money" may be spent upon machinery, so-called spring plates, rubber pads, and steels, but they cannot assist so effectively as a few penny's worth of leather used to vary the boot sole. There are three classes of feet: the excellent, the medium,

[19] THOMAS, H. O.: *Fractures, Dislocations, Deformities, and Diseases of the Lower Extremities,* page 7.

and the bad. The first wear the outer side of shoe heels more than the inner side, the medium wear the heels level, the bad ones wear down the inner edge and posterior curve of the heels. By a modification of the boot sole, it is possible to make a bad foot behave like an excellent one. Here are sketched four cases which will be useful guides to practice and will facilitate my demonstration.[20]

The following is typical of his very instructive though narrative case reports:

Eight years ago, a young lady, suffering from splayfoot came, accompanied by her mother, to consult me. The arch had 'given' slightly. Noticing that they were foreigners, I enquired if they purposed staying long in England. They replied that they were leaving on the morrow for the United States. This consultation took place on a Sunday morning. During our conversation they informed me that the state of the younger lady's foot was one of the inducements which had led to their visiting this country, and on arrival, they had made their way direct to a city to which the best medical and surgical skill is supposed to gravitate. Several surgeons had been consulted, but with no benefit. My prognosis being favourable, they expressed a willingness to adopt my advice. The lady's boot heel was crooked, instep well flattened, and filled up level. After this alteration of the boot had been made, the reasons for so modelling it were fully explained. Further, their attention was drawn to the value of each change, particularly to the crooked heel as first in importance, the bevel of sole being the lesser; and that at a certain date the altered instep should be omitted, continuing the use of the crooked heel for a longer period.

All this information would enable them to either superintend the repair of, or the construction of, a fresh one when required. Thus instructed they were dismissed. Two years afterwards I received the following note:

[20] Ibid., page 8.

Excelsior, Minnesota;
August 12, 1880;

Hugh Owen Thomas, Esq.;
Dear Sir:

You may remember being consulted about my daughter's ankle nearly two years ago, just previous to our returning to America. It gives me great pleasure to write to you that, after wearing the boot you gave her for nearly two years, as you directed, the ankle has entirely regained its natural strength and action. We both gratefully acknowledge your skill. I feel I have been rather tardy in informing you concerning the success of your treatment, and hope you will accept an apology for this apparent neglect.[21]

With regard to pronation or footstrain Mr. Thomas continues:

As I look upon the valgus boot as a very useful addition to our orthopedic armamentaria, I shall here give a detailed description of its construction. To construct this boot so that we get the utmost assistance from it, the inside surface of the sole, the part directly in contact with the foot, should be perfectly flat. All old boots are such that the hump goes down by the constant pressure of walking. If the boot be new its 'hump,' so graceful and yet useless, can be knocked down with a mallet or broken by strain over a chair back. This is of much importance in those splayfeet not caused by injuries. Then the heel should be crooked, as is shown in Fig. XIII, a right-foot boot. This is sufficient for slight cases and some traumatic ones. But for the severer cases of splay, no matter how caused, the crooked heel may be, with some advantage, supplemented by the sloped sole as well. The sloped sole should extend not quite to the ball of the big toe, and the lines of the upper and lower surface of this sole should be quite straight, not with any feeling of hump, flat inside the boot, as well as on the ground surface of the sole; and this sole, when properly made, is not visible on the outer side of the boot.

The Plate shows a right-foot boot altered for splayfoot. The construction of this boot is very simple, yet no shoemaker can

[21] Ibid., page 12.

be trusted to make the alteration correctly. They generally make a hump and also neglect to slope or crook the heel so that, whether we look at the inner or outer aspect of the shoe, a wedge is seen which should show on the inner aspect. As the wedge is very noticeable when the boot is examined in your hands, a shoemaker concludes that a mere uniform wedge is required and important, because it is the greatest observable alteration, whereas to the surgeon, the crooked heel, which is not readily observed, is the most valuable alteration. So to make sure that the sufferer gets an efficient boot, the surgeon, besides instructing the shoemaker, should inspect the change before the boot is delivered for use, and if any repair be required afterwards, he should still distrust the repairer, and again supervise the job. This is my conclusion after twenty-four years wrangling with St. Crispin's fraternity. No boot can be properly converted to suit a splayfoot if the heel point be not as wide as the heel part of the foot sole.[22]

Thomas' capacity for "taking pains" is nowhere illustrated any better than in this devotion to the adjustment of boots for his patients with foot strain or pronation. This was one of the lessons impressed upon us by Dr. Ridlon. To refer such patients to a shoemaker or even a brace maker to "carry on" without inspection or after care by the surgeon is to dispense much less than justice to the patient with an existing or impending disability.

As one reads the early accounts of the treatment of clubfoot, it seems that all crooked feet were corrected almost to normal with no great amount of difficulty. Writers like Stromeyer, Little, Delpech, and Scoutetten, all have illustrations showing well corrected, nearly normal feet—after performance of Achillis tenotomy and the use of braces—sometimes in a few weeks or months. That Thomas observed the fundamentals such

[22] Ibid., pages 14-15.

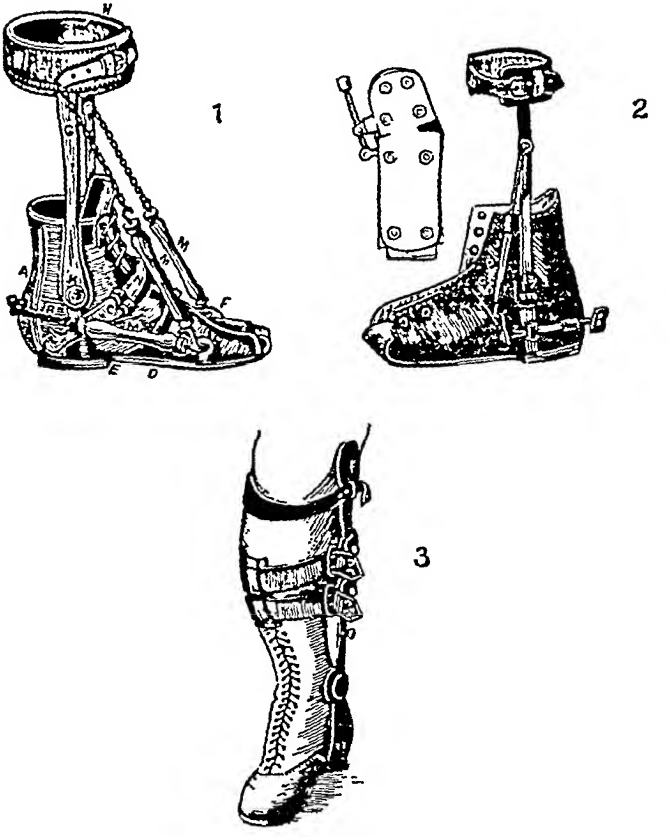

Fig. XX. (1) Sayres' club-foot shoe. (2) Improved club-foot shoe. Measurements were made by placing the sole of the patient's foot on a paper and sketching it. It was necessary to give the length of the sole of the foot, the circumference of the calf, the circumference above the ankle, the length from the sole to the upper part of the calf, whether it was the right or left foot, and whether the talipes was varus or valgus. Each sold at that time for $10 to $15 from W. F. Ford of New York. (3) Bow-leg apparatus. The measurements required for this were the length from the sole to the ankle-joint, the length from the sole to the knee-joint, the circumference below the knee, and whether it was the right or left foot. In 1874 this was sold for $7.50 by Caswell Hazard and Co. and W. F. Ford of New York. It was Thomas' dissatisfaction with the braces he saw when he was a student in Paris, and with clumsy and inefficient apparatus like this that led to the simpler, less expensive, better Thomas "irons" and splints.

as early care, adequate correction, and boots and braces in the after care, is shown here. Less than such a program, as most of us have learned, gives us less than uniformly good results and what our predecessors—having failed with tenotomy alone—commonly call "recurrent" or "inveterate" clubfoot. Mr. Thomas said:

"Equino Varus." This form of clubfoot, is, if not corrected, most annoying to its possessor in after life, and, unfortunately, is one of the congenital deformities of the foot most frequently met with. The main impediments to the correction of Equino-varus are the tendo Achilles limiting flexion of the ankle, and the shortened plantar structures.

To overcome the resistance to the correction of Equino-varus we ought to commence treatment by tenotomy of the tendo achilles and afterwards by mechanical aid to obliterate the plantar varus. ("In recent practice it is often the custom to keep the tight heel until the contracted foot has been straightened out with the heel cord to pull against.") The mechanical assistance employed by me for unfolding the foot, is the wrench. By the aid of this contrivance, the period expended in correction is vastly curtailed. *If the deformed person is brought to the surgeon early—from about two months to eight months old;* the sooner, the easier corrected—and if the case is not an extreme example, four week's treatment is enough to gain correct symmetry; an extreme case may require as many as four months. The special advantage which the foot-wrench gives us, is, that often a case neglected for many years, can, with a little more labour be made to be perfectly useful, if not symmetrical.[23]

After correction of cases long neglected, or of very exceptional difficulty, and when the patient is of an age that he can walk about, it may be advisable to have some appliance attached to his ordinary boot to conserve what we have gained, or to overcome any tendency to relapse.

An error of construction is made in connection with the construction of iron supports to thwart varus—a joint is usually

[23] Ibid., pages 24-25.

placed upon the stem opposite the ankle—whereas if none is required, it will answer the intended purpose better to hook the iron stem into a brass-lined hole in the inner aspect of the heel.[24] This is a sufficient joint, and makes the stem rigid where it is most wanted. I notice that some orthopedists are now following my example. This, I think, is one fact showing the correctness of my criticism.[25]

Mr. Thomas' inclination to direct and control the patient's growth in the treatment of deformities is illustrated in his discussion of bowleg. He indicates his knowledge of, and respect for, surgical procedures, as he did in intestinal obstructions, by allowing, in certain cases, a place for osteotomy or osteoclasis. But the use of apparatus to maintain correction after operation, and to protect the parts during repair is not forgotten. He says:

Until the present rage for performing subcutaneous section, for the relief of deformities of the long bones, has abated, it is reasonable to suppose that any proposal for a return to a more efficient application of a previous practice will not be entertained. I admit that on very rare occasions we do meet with cases of "bow-legs," "knock-knees," and "flexed hips," which except by section of bone, are unalterable because the rule applicable to the reduction of deformity though applying is not practicable for we could not bring sufficient strain to bear upon the point of opposition without devitalizing intervening structures. With the exception of a very small minority, the deformity popularly known as "bowlegs," is easily altered without interference by either saw or chisel. This is done by fracturing the leg if possible; or when this is not practicable, to reduce it by straining repeated daily. In order to obtain sufficient leverage to attempt fracture or, failing this, to get enough power to overstrain the bones of the leg, the lever is employed. It is applied by bandaging it very firmly to the superior and

[24] The inside iron and outside ankle strap still in universal use.

[25] THOMAS, H. O.: *Fractures, Dislocations, Deformities, and Diseases of the Upper Extremities,* pages 29 and 30.

outer aspect of the leg so that the fulcrum is situated at, or just above, the part to be damaged.[26, 27]

Mr. Thomas' ingenuity in the use of his own rather frail physical equipment was displayed very often. His use of "powerful" assistants from the docks in shoulder dislocations was effective but not so clever as his slings, leverage, and his own body weight in dislocations of the elbow, wrist, knee, and ankle. Dr. Ridlon used to make quite a point of using his rather heavy abdomen over the edge of the table in doing manual osteoclasis, and clubfoot and congenital hip dislocation manipulations.

The foot backward and leg forward is easily reduced if the surgeon is consulted early; he will only have to flex the leg upon the thigh, and the thigh upon the trunk; then while an assistant maintains the extremity in this form, the surgeon, with one hand, grasps the heel to draw forward the foot, while, with the other hand placed just above the ankle, he forces backwards the tibia and fibula, and reduction follows.

But it frequently happens that no skilled assistance is at hand, or, because some other cause has allowed much time to elapse, there may be a delay extending as long as two or three weeks. The reduction at this late period is not so easily performed. The surgeon can increase greatly his individual powers and succeed without the aid of an assistant or of an anaesthetic. The power of the surgeon's arms is assisted by the efforts of his trunk muscles, through the medium of a bandage passing behind his neck and under the patient's heel; a counter force is gained by attaching the patient's leg to the surgeon's foot with a bandage. The surgeon, as he finds best, may employ both hands to the patient's heel, or as in the illustration, one hand to the heel and the other to the leg.[28]

[26] This is the early Thomas "osteoclast."

[27] THOMAS, H. O.: *Bowleg,* Part VII, pages 3-4.

[28] THOMAS, H. O.: *Simple Dislocation of the Ankle Joint,* pages 38-39.

CHAPTER VIII

The Influence of Hugh Owen Thomas Dr. John Ridlon, and Sir Robert Jones Upon Each Other and Upon Orthopedic Surgery

IT DOES SEEM important to preserve the record of this period that reaches back into the beginnings of orthopedic surgery in this vicinity. Dr. Ridlon was about fifteen when Valentine Mott died in New York. He knew Nathan Smith, and James Knight the founder of *"The Ruptured and Crippled."* Doctor Mott, after a three years' residence in Paris in the 1850's, was the first general surgeon to advocate, upon its merits, orthopedics as a special branch of surgical practice.

Doctor Ridlon said (November 6, 1933):

> When Jimmy Knight died and Gibney succeeded him, Gibney had never been allowed to do any surgical operations. He jumped into operating on everything—it is still a question in my mind whether it is more foolish for a general surgeon to try to do orthopedics or for an orthopedic surgeon to try to do general surgery.

During his entire career in Chicago, Dr. Ridlon relied upon men like John B. Murphy and Bevan, as consultants, to do his major surgical procedures.

When I published my little book on the history of the American Orthopedic Association for the fiftieth anniversary meeting in Lincoln, I had a great deal of help from Doctor Ridlon. Among other things, he called my attention to the fact that the first list of members published in Volume I of the *Transactions* in 1889, was not a true list of charter members.

Several names were included of men who had not attended the meeting of organization or the first meeting. Among these was Bernard Roth of London, who was elected upon the nomination of Doctor Ridlon, the year of 1887 following Doctor Ridlon's visit to Thomas, and to other British surgeons. Robert Jones and Hugh Owen Thomas were elected to membership in 1890, also upon Doctor Ridlon's nomination. On the same page of my book, which records the election of Thomas and Jones, I have a reproduction of Robert Jones' bookplate which I found in a second-hand bookstore in London.* See Fig. XXII.

* In the transactions of the American Orthopedic Association meeting held in Philadelphia in 1890, when DeForest Willard was President and Dr. John Ridlon was Secretary and Treasurer, it was noted that the following physicians were elected to membership:

Adams, Wm. (Corr.) Hon.....London 1895, d. 1900
Hoffa, A. Corr.....Berlin, d. 1908
Jones, R. Hon.....Liverpool, d. 1933
Kermission, E. Corr.....Paris, d. 1928
Levy, S. Corr.....Copenhagen, d. 1916
MacEwen,[1] Sir Wm. (Hon.).....Glasgow, d. 1924
Owen, E. Corr.....London, d. 1916
Phelps, A. M.....New York, d. 1902
Redard, P. Corr.....Paris, d. 1916
Smith, E. Noble Corr.....London
Thomas, Hugh Owen Corr.....Liverpool, d. 1891
Walsham, W. J. Corr.....London, d. 1903
Whitman, R.....New York
Wright, G. A. Corr.....Manchester, Eng., d. 1919
Young, J. K.....Philadelphia, d. 1923

[1] Sir William MacEwen had two sons. One was Capt. William MacEwen who was on duty with the B.E.F. in France and the other was John A. C. MacEwen who published a work on Fractures—Artificial Limbs, etc., in 1919. See my Catalogue. (H.W.O.)

Hugh Owen Thomas, John Ridlon, and Robert Jones began their first association in Liverpool on common ground in several important respects. They were natural intellectuals with much better than average educational backgrounds; and they were honest. They were devoted to medicine, and to the care of individual patients without having lost sight of fundamental principles in science and surgery. Thomas was almost fanatical in his feeling about his work and his responsibilities —clinical and professional. Ridlon could be as serious as Thomas in his condemnation of carelessness or sham in any professional capacity, but Ridlon could dispense his condemnatory expletives "with a smile," which Thomas could not.

From this point, although with equal ability and ideals, Robert Jones departed, in all his contacts with the profession and the great public which came to know him better than either Thomas or Ridlon. Robert Jones was always quiet, tactful, cheerful, expecting and receiving the best from his patients and the profession. Thomas' very great popularity in Liverpool was almost entirely on the basis of his very extensive professional services to the sick and injured.

Robert Jones eventually extended his work far beyond the bounds of Thomas' practice, and greatly enhanced not only his own but Thomas' reputation and influence. He did this by his constant kindness, tact and generosity—personal and professional—often beyond what the recipients deserved. When it came to credit and praise Robert Jones never displayed the legendary British "reserve."

Mr. Thomas' training and education, about which there has always been some discussion, was excellent for the career he had before him. Even the bone setter

influence of his father and of his other antecedents had its beneficial effect upon his professional work. Both his father and mother were intelligent and ambitious for Thomas, and for his three brothers—all of whom went, together, to Edinburgh for medical degrees, and later to University College, London. The broad educational and cultural influence upon Hugh Owen Thomas of his mother, and of his teacher, the first Owen Roberts, have been mentioned by all of his biographers. When the other Owen Roberts—brother of Thomas' mother, medical scholar and friend of Percival Pott—became Thomas' preceptor, the same tendencies and ideals were broadened and perpetuated. All of these influences combined to assist in making Hugh Owen Thomas the competent crusader for principles of all kinds that he became.

During Mr. Thomas' lifetime, his other bone-setter antecedents and his own "unqualified" father, were often referred to as disqualifying Thomas for his work as a surgeon. One must observe, however, that not only Mr. Thomas' education in medicine and surgery, but even the association with his father, were such as to influence him more and more strongly toward those ideals of practice, which made him a well-qualified and successful practitioner. But he was a severe critic of the irregulars, as well as of members of the regular profession, who fell short of his ideals in taking care of their patients. It is perhaps not too much to say, that Mr. Thomas became an expert as to what constituted maltreatment, whether at the hands of a bone-setter or a member of the College of Surgeons. Mr. Thomas had seen so much less than justice measured out to so many patients, that he was quick to seize upon defects in the practice of others, and he did not

hesitate to find fault even with the "professors" in the so-called "regular" profession. This was not so much because of his personal feelings about some of his contemporaries, competitors, and critics, but because he had set his own standards of practice so high, and his regard for the welfare of his patients had become so keen, that he was never satisfied with less than the best he knew in taking care of them. That Mr. Thomas was somewhat less refined in regard to personal feelings, whether among his patients, or among his professional associates, is perhaps not so much to be wondered at. The irritation which Mr. Thomas felt on account of failure to recognize his "principles" and because of criticism of himself must, of course, have affected his remarks about his contemporaries. Even so, Mr. Thomas was much less inclined to personal remarks about his neighbors than to criticism of their professional methods.

With regard to Thomas' "isolation," Dr. Ridlon, in writing later to Frederick Watson, said:

> Thomas seemed to me to feel keenly the attitude of the physicians and surgeons of his country—that they looked down on him as a bone-setter and that he was ostracized professionally. This appeared to be true. I visited Mac Ewen in Glasgow, Wright in Manchester, William Adams in London; (and many others) not one of them had a kindly word to say of Thomas. But I was able to compare their work with his. One could gain more useful knowledge in following Thomas around for an hour than elsewhere in Great Britain for months.[1]

Frederick Watson had a different feeling about Thomas' "isolation."

> Thomas established no school of thought. No appointment was ever offered him in hospital or college. Only the very poor

[1] WATSON, FREDERICK: *Hugh Owen Thomas, A Personal Study*, page 69.

mourned his death in Liverpool. Would these things have oppressed him with a sense of futility and failure? They would not have affected him at all.

With the exception of Robert Jones, who accepted the Nelson St. routine at fifteen and never ceased to revel in it for sixty years, Thomas must have been the hardest worker in the medical world. It was the habit at 11 Nelson Street, during some seventy years, to snatch a sandwich between cases. This triumph over food, over waste of time, over carefully regulated hours is worth reflection.[2]

One would need to travel far in the fields of polite literature—poetry or prose—to find a more felicitous phrase than the following from a book on surgery by Sir Arthur Keith. He said, speaking of Hugh Owen Thomas:

He treated muscles as he treated his patients. He relieved the weak and oppressed, he restrained the strong.

Owen Thomas had the misfortune to appear in a period when the Hunterian traditions were overshadowed by (other) great advances.

The microscope seemed to reveal a world of disease for which Hunterian methods were out of date, whereas it was the same world looked at a little more closely.

Yet the great legacy Thomas has left to medicine would be, not his splints or appliances, his principles, his practical application of anatomy or of physiology, but his personal care in the service of his patients, his peculiar ability as a biological surgeon, his remarkable gift for taking pains.[3]

In further description of the "rooms" at 11 Nelson Street—as used by both Thomas and Jones—Watson says:

The equipment of the establishment in Nelson Street is such that no outside aid is needed. There is a blacksmith at work

[2] WATSON: Ibid., page 93.

[3] KEITH, SIR ARTHUR: *Menders of the Maimed,* 1919, page 60.

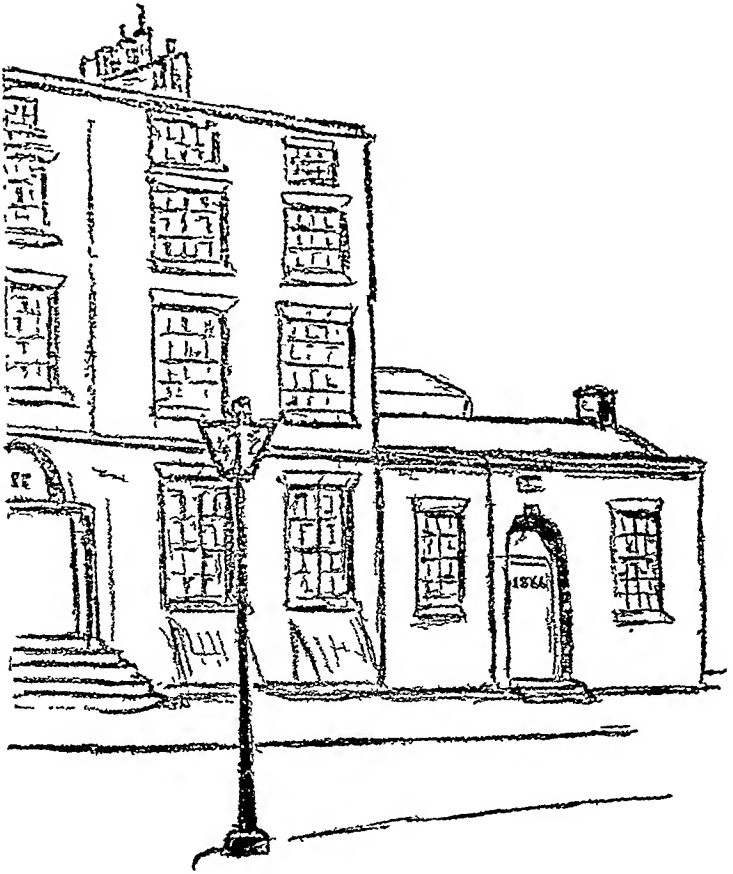

Fig. XXI. The house at 11 Nelson Street, showing the surgery door with the date 1866. (From McMurray, T. P.: *The Life of H. O. Thomas,* Saml. Hill & Sons, Liverpool, 1935.)

in a smithy, a saddler finishing off the various splints, and the duties of others are the making of adhesive plasters and bandages, and the preparation of dressings. There are splints of every size to suit any possible deformity that may appear, or for any fracture that may have occurred. No matter from what distance a patient comes, no matter whether the affection be spinal caries, hip disease, or fractured thigh, he is always able

to return home in an hour or so, most accurately fitted with a simple and appropriate splint.

To see Thomas at work in his surgery was a liberal education. His mechanical knowledge was so profound and his observation so accurate that when a splinted patient appeared before him in discomfort there was no occasion for speech, the faulty spot was immediately pounced upon and corrected without delay. Although the examination was brief, it was intensely concentrated, and it was useless for either patient or assistant to ask any questions while it was in progress.[4]

Frederick Watson had explained previously:

It was to relieve the terrible distress of these people that Thomas opened his free Sunday clinic, where, assisted by a large staff, he laboured from early morning throughout the day. It was at these Sundays that the spectacle of deformed babies and young children first set the mind of Robert Jones upon the problem of crippling diseases. "Nelson Street on Sunday morning was an extraordinary sight," recalls Dr. David Morgan who assisted Thomas; "Before the day of buses and electric cars patients would be brought in handcarts, perambulators, wheel-barrows" (the universal Welsh "barrow" was still in use in 1918. H.W.O.), "donkey-carts, and an occasional horse cab."

Such conditions afforded inexhaustible material for the development of the principles and the practice of the surgeons who toiled in their midst. "During all his professional life," wrote Thomas, about himself, in his eccentric impersonal fashion when attacked by an American surgeon, "he has worked amongst what is termed the 'lower orders' and envious of surgeons 'who had the advantage, when necessary, of patients being indoors,' at the expense of a suitable institution. All contained in the *Contributions* (i.e., his surgical writings) was gleaned in the 'courts,' not the 'squares' of Liverpool. The field in which Mr. Thomas worked entailed a heavy physical and pecuniary strain that stimulated him to devise means which, while effective to resolve the lesion, relieved him of much toil." [5]

[4] WATSON, FREDERICK: *The Life of Sir Robert Jones*, 1934, page 56.

[5] Ibid., pages 51-52.

Mr. McMurray (1935) proved that he is the spiritual heir of Thomas and Jones at Liverpool, in his splendid centenary lecture. He said:

In 1883 was published what was probably the greatest contribution ever made to our knowledge of articular surgery. This was Thomas' work on *The Principles of the Treatment of Diseased Joints.* Here were given clearly the great basic principles on which joint surgery must be based. It was to some extent a recapitulation of a considerable portion of the principles enunciated in his book on the *Hip, Knee, and Ankle Joints.* But that was not all. He had read the criticism of his previous work and had formulated his principles in such an easy style and with so clear an outline that no one could possibly mistake their meaning. His definition of a healthy, an inflamed, and an ankylosed joint (see our Chapter III, H.W.O.) left no chance for misunderstanding, and the principles on which his treatment rested were supported by a mass of evidence. He laid down definitely for the first time the truism that, "No amount of rest without disease will produce ankylosis, although prolonged rest may stiffen a joint; this is a trivial and only a temporary hindrance." [6]

Mr. Aitken, in his book on Thomas, is indignant, and almost tearful over Thomas' failure to "come out of his shell," and attend meetings instead of staying at home and attending to his practice. Actually of course, Mr. Thomas did much more than attend to his enormous practice. He did a great amount of reading, a lot of very useful writing, which too few surgeons have read, and maintained contact with Mr. Rushton Parker who initiated or encouraged Thomas' *Contributions.* Thomas corresponded with many surgeons, especially in Germany and America, in a way that laid an extensive and substantial foundation for some of the later

[6] McMURRAY, T. P.: *The Life of Hugh Owen Thomas,* 1935, page 33.

work of Sir Robert Jones. Mr. Aitken says that had it not been for Sir Robert Jones, Thomas would have been forgotten, and perhaps lost to his country, and that Great Britain might have had to reimport Thomas from America. John Ridlon, if no one else, would have seen to it that he was not forgotten. It is quite true that Doctor Ridlon took his rôle as an apostle for Thomas very seriously, and as an apostle he performed his duties very well. I have heard Dr. Ridlon relate an incident that I do not see elsewhere.

One Sunday, riding in the two-wheeled cart that Thomas drove with two horses—tandem, Mr. Thomas turned to Dr. Ridlon, and said:

> John, I am going to say something to you that I want you to take very seriously. You know, I am extremely fond of Robert, but I consider him much less able than yourself, to carry on the teachings for which I have been contending in this country. Robert will not make the same kind of a contest that I have, or that you would, for the establishment of these principles which I consider so important in the correct treatment of bone and joint disease.

Doctor Ridlon, always told this, with the final remark:

> Of course, Sir Robert has made a much greater success of his work than I, but I do think that I have had a great deal to do in upholding the fundamentals that Thomas advocated, and in teaching the correct use of the splints and apparatus that no one else has employed as well as he did.

It may not be tactful, but I think it is important to remark that during World War I, when Sir Robert Jones succeeded in popularizing the use of the Thomas Caliper Splint, for the emergency, as well as for the later treatment of compound fractures of the thigh and

leg, he made it an achievement highly creditable to himself, as well as to the memory of Hugh Owen Thomas. Even so, most of those who were associated with Sir Robert Jones, and some who had been associated with him for a long time, had obviously never fully understood Thomas' teachings, even as presented to them by Sir Robert Jones. This, I think now, was due to Sir Robert's being more tactful but less strict; neither so dogmatic nor so effective as Thomas.

While Sir Robert made Hugh Owen Thomas and his splints "acceptable" he did not insist, as Thomas would have done, upon "surgical rest" as a principle of treatment in every case. So that in every hospital, and in every area, I saw not only badly fitting and poorly applied Thomas splints, but modifications and adaptations, or even so-called "improvements" of the Thomas apparatus, which rendered them less efficient and less useful than if they had been used as Thomas originally described. In the French and American hospitals this deviation became so great, that even in the use of plaster-of-Paris, immobilization in correct position, protection of the patient against trauma and muscle spasm, and even recovery of the patient in correct and good functional position, was often far short of the standards set up by Thomas and Sir Robert Jones. Failure to accept and understand Thomas' teachings, failure to observe his fundamental principles, and inability to accept "rest" as a therapeutic fundamental as "implemented" by Thomas, must not be laid at the feet of Thomas, but at the feet of those who failed to read, or failed to understand writings, teachings, and case reports which have not been improved upon, except as to details of technique, even to the present time. (See chapters I to VIII)

When the Ridlon-Jones book was published in 1899, Dr. Ridlon was rather grieved that he had not been able to get as much help from Robert Jones as he expected, even after he had prepared most of the manuscript for publication. Many years later he had another shock. In a letter (July 9, 1935) he says:

I have received from McMurray some reprints of articles by Jones in which he credits me as coauthor. I did not know about these.[7] He evidently made use of the copies I sent him—citing *himself* as coauthor—rewrote them, some more, and some less, and sent them in for publication and never told me of it. I am sorry that Jones did this but it matches up with his refusal in 1891 to join me in putting all of Thomas into a single volume, and it confirms what I have said—that Jones' greatest achievement has been to make Thomas' principles acceptable to the profession. (I should say Thomas and his splints, with some reservations as to "principles." H.W.O.)

With regard to Aitken's book about Thomas, Dr. Ridlon wrote:

I wrote Watson that Aitken's book on Thomas was mostly about Aitken.

Watson said:

From Thomas, Robert Jones learned, or at least assimilated, the practice of handling patients in a cordial spirit. "I cannot thank you enough," wrote Florence Nightingale (to Thomas) in February, 1887, "for your great kindness in granting your invaluable advice to the cripple Faith Schofield, your old patient, and in even giving her board and lodgings for one night if necessary," and signed herself—"Yours ever gratefully." It was, in fact, part of Thomas' sardonic humour to bark in a fashion which seldom deluded his patients. Frequently he kept poor cases in his nursing home without charge, and was only brusque

[7] (It seems that Dr. Ridlon forgot at least two papers published by him in 1892 with Robert Jones as co-author. H.W.O.)

if they thanked him. And upon occasions, if a patient was really frightened by his manner, Mrs. Thomas would receive an urgent message for a cup of soup to be sent at once in order that some old lady might be restored to equanimity.[8]

In 1886, after five years as Honorary Assistant Surgeon at the Stanley Hospital, Robert Jones was appointed surgeon. On March 16th, 1887, he decided that his prospects were sufficiently promising, and he married Miss Susannah Evans, daughter of a well-known Liverpool merchant.

In 1889 another vacancy occurred at the Royal Southern Hospital, and, busy as he was, he repeated his unsuccessful application of seven years before—and was elected, without opposition, Honorary Surgeon and Dean of the Clinical School. In support also of his candidature was the recommendation of the Medical Board of the Liverpool Stanley Hospital, and this includes a paragraph which is worth noting. "He has," it states, "shown an indomitable perseverance in the vigorous prosecution of original research; and his numerous publications on the achievements of surgical science, together with undeniable skill in the various departments of operative surgery, mark him as one who will certainly add lustre to the already long list of names whose writings adorn English surgical Literature."

In orthopaedic surgery as practised by H. O. Thomas, he had been well grounded. But there remained the principles upon which the reputation of Nelson Street was established. When Thomas remarked: "A man who understands my principles will do better with a bandage and a broomstick than another can do with an instrument-maker's arsenal," he made a statement which lay at the heart of his teaching.[9]

In September, 1920, the Liverpool Medical Institution founded a Hugh Owen Thomas Memorial Lecture, the first of which was delivered by Robert Jones. At last after many years the hour had struck for him to give his testimony to the memory and work of his teacher, and to the influence of his work in the war. It must have been an historic occasion to those who recalled the past and the figure of Thomas ploughing

[8] WATSON, FREDERICK: *The Life of Sir Robert Jones*, 1934, page 58.

[9] Ibid., page 61.

his lonely furrow.[10] In his concluding words, Robert Jones spoke with pride of the work of Thomas as "an inspiration to all who fight for new principles; for, with scarcely a helping hand, he struggled through the stormy waters which face all pioneers and died having added lustre to the profession he loved." [11]

The influence of Hugh Owen Thomas and Robert Jones on the salvage of life and limb on every front in the Great War must ever remain a moving and immortal chapter in the history of 11 Nelson Street. Thomas had offered the splint which bears his name to the French Army in the Franco-Prussian War. Had they accepted it, thousands of French soldiers would have been conveyed to safety. But, judging by contemporary references the splint was little known until the European War. In 1887, R. F. Tobin, F.R.C.S., speaking upon the kind of dressing most available for gunshot fractures of the lower limbs in war, remarked: "A Liston's or a Bryant's splint gives immobility as long as it is supplemented by the patient's bed, but, as far as my experience goes, no splint on which the limb does not rest by its own weight gives satisfactory support when for any purpose the patient has to be lifted. The foregoing conditions are fulfilled by the splint to which Mr. Thomas of Liverpool, has given his name." But, still in 1887, when Thomas lectured before the Harveian Society of London, the President blandly remarked that "many persons were unaware whether the inventor of Thomas' splints was still alive and in practice." But he lightened this rather depressing introduction by adding that "he had often heard the friends and parents of children who were wearing the apparatus call it 'St. Thomas' Splint'

[10] When Evan Thomas, the father of H. O. Thomas, located for practice as a bone-setter in Liverpool, in 1835 he announced his specialty—"Fractured and Dislocated Bones"—not only to the public but to the medical profession. In this he was supported by a testimonial from John Griffith, E. B. Parry, David Roberts, H. I. Evans, William Davies and Owen Roberts, surgeons and other prominent citizens of Anglesea. In Anglesea, Evan Thomas, his father Richard Evans, and grandfather Evan Thomas, had all attained celebrity in the treatment of wounds, sprains, and fractures.

[11] WATSON, FREDERICK: *The Life of Sir Robert Jones*, page 239.

Fig. XXII. Bookplate of Dr. Robert Jones. (From Orr, H. Winnett: *50 Years of The American Orthopedic Association,* Lincoln, Nebraska, 1937.)

—evidently a playful aside. One may be certain that Thomas greatly enjoyed the full flavour of London's reception of a provincial surgeon." [12]

On October 16th, 1932, Sir Robert Jones was able to make a broadcast appeal for funds for the Royal Southern Hospital,

[12] Ibid., page 153.

an institution with which he had been connected for half a century. His appeal made a profound impression on those who heard, and was a model of its kind. But what moved his friends even more than the eloquence of an exhausted man speaking from his heart for the hospital where he had operated during so many years, was the delicacy with which he paid his final tribute to H. O. Thomas. "Don't let us forget," he said, "that in this Hospital were first practised those principles of orthopaedic surgery laid down by that surgeon of genius, Hugh Owen Thomas, which led to such remarkable developments in the Great War." Thomas had no connection with the Southern, but the intense loyalty of Robert Jones to his memory had never lost its early fire. Within this brief speech also he was able to say a word for his old colleague, Sir Ronald Ross, to whom in his last illness in London he had been a constant solace.[13]

Already in 1894, Dr. Ridlon was spreading the teachings of Thomas—and his apparatus by a series of excellent articles in the *Reference Hand Book of the Medical Sciences*. He wrote on anchylosis, clubfoot, joint disease, bowlegs—all illustrated with cuts from Liverpool. He said:

It is no longer believed that true ankylosis can be produced by immobilization alone. (But some of our surgical profession have not yet "caught up" with Thomas and Ridlon!)

Dr. A. J. Steele of St. Louis said:

Mr. Thomas was opposed to traction, and violently assailed those who employed it in the reduction of deformity, or in the treatment of diseased joints, terming them "tractionists," and claiming that no advantage was gained but that injury was done and time lost. I believe he was wrong, and I exceedingly regret the bitter spirit in which he assailed the many able surgeons who employ it both in the treatment of joints and fractures.

While condemning traction, yet Mr. Thomas was very

[13] Ibid., page 294.

tenacious as to whom belonged the credit of having first introduced it into practice, and asserted that Americans should not claim priority in its use, as Mr. James, of Exeter, had advocated its employment and explained his method as early as 1839. Now this may be true, but we may justly claim the use of adhesive plaster as a practical means of making attachment to and of getting a hold on the limb to be drawn upon—a convenience that the gaiter or laced legging can never equal.[14]

When Dr. Ridlon printed his book on orthopedic surgery in 1899, it carried the name of Robert Jones as co-author. Dr. Ridlon had tried previously to persuade Robert Jones to join him in a project for a volume containing all of Thomas' *Contributions*. Robert Jones not only declined to do this but was not of very much help to Ridlon on the *Orthopedic Surgery*. The preface to the 1899 book indicates that Dr. Ridlon was not too happy about the matter. Actually it would seem that while the Thomas splints and techniques are described one misses the spirit of Thomas as to fundamentals and Thomas' influence as a clinician. Even Robert Jones in his book on the *Paralyses* (with Tubby in 1903) and his case reports, has more of the feeling of Hugh Owen Thomas. Dr. Ridlon's "Preface" is as follows:

> The authors of this volume have undertaken to preserve the things of most value in the writings on orthopedic surgery by the late Hugh Owen Thomas, modified by their own personal experience and convictions; they have endeavored to make a volume for the use of the student and the general practitioner and have omitted much that would be of interest and inserted much that may not be of interest to the orthopedic specialist. These lectures have been delivered by Dr. Ridlon in the Northwestern University Medical School, and many of them have been added to and amended by Mr. Jones. Some of the lectures,

[14] STEELE, A. J., pages 3-4.

however, have not been read by Mr. Jones, and he should not be held responsible for any Americanisms that appear in these pages.

When the publication of these lectures was commenced in the *Philadelphia Medical Journal* it was intended to cover the entire subject of orthopedic surgery and make a complete book, but the change in management and in type of the Journal led to a discontinuance of the project, and the incomplete work is now offered with many misgivings and apologies—John Ridlon.[15]

Dr. Ridlon's account of his first meeting with Mr. Thomas, was a favorite anecdote with him, and very typical of both men.[16]

Dr. Ridlon arrived in Liverpool (in 1887), and presented himself in the receiving room for patients at 11 Nelson Street without advance warning to Mr. Thomas. The waiting room was full of patients, as usual, and there was a tremendous row in one of the side rooms behind a closed door. Dr. Ridlon rapped on this door, but received no invitation to come in. Thinking he had not been heard on account of the noise, he opened the door and stepped in anyway. Mr. Thomas with his wrench was correcting the club foot of a small child on the counter of his pharmacy. The foot having been straightened and bandaged, he turned to Dr. Ridlon, whose presence he had observed, and Dr. Ridlon said, "Mr. Thomas, I am Dr. Ridlon of New York. I have come to Liverpool to find out whether or not your results in the treatment of joint disease are as good as you say they are in your book; that is whether I am a fool or you are a liar."

Mr. Thomas was apparently not offended for he answered at once, "Dr. Ridlon, I think we shall have

[15] RIDLON, J., and JONES, R.: *Lectures on Orthopedic Surgery*, 1899.

[16] From a personal letter.

no difficulty in satisfying you about that,"—which he did.

Another account of Dr. Ridlon's first employment of the Thomas splint in New York upon his return, was contained in a letter he wrote to Dr. Levinthal of Chicago in February 2, 1931. This letter was written in reply to a request from Dr. Levinthal for material to be used in writing a biographical sketch for Frederick Watson's magazine *The Crippled Child.* Instead the letter from Dr. Ridlon was published as an autobiography. This annoyed Dr. Ridlon very much as indicated in some of his letters to me. Among other things, Doctor Ridlon said:

In 1880, I was appointed assistant attending surgeon at St. Lukes to Doctor Newton M. Shaffer, and in September of the same year, assistant to the professor of orthopedic surgery, Doctor Shaffer, at the University Medical College; there I served five years. Then I went to the dispensary of Bellevue Hospital, and into the first orthopedic division as representative of the College of Physicians and Surgeons; there I served two years. Doctor Shaffer was the consulting orthopedic surgeon. At the end of 1887, before taking over the position of attending at St. Lukes, I went abroad to see the work of Hugh Owen Thomas, and was the first American surgeon to visit him. Returning, I made the first Thomas hip splint in the cellar of my home at 337 West 57th Street, and put it on a child in my service at St. Lukes. Shaffer ordered me to take it off. I refused on the ground that I was responsible for the treatment of the patient. He succeeded in preventing my reelection at the end of that year, and I was out of a hospital position. Charles McBurney, one of the two professors of surgery at the College of Physicians and Surgeons, appointed me on the surgical staff of the Vanderbilt Clinic; there I served two and a half years. McBurney promised me the professorship in orthopedic surgery, but Bull had also promised it to V. P. Gibney, and I realized that in the course of time McBurney would lose out, so I ducked out for Chicago.

With regard to Doctor Ridlon's second visit to Thomas, he gives the account in this way:

In 1887, Shaffer organized the American Orthopedic Association, and I was a charter member. In 1890, the Tenth International Medical Congress was to be held in Berlin. Shaffer had the idea of an Orthopedic Section. A propaganda committee was appointed with Shaffer and Sherman, and with me as secretary. I wrote to every orthopedic surgeon in the world, and left New York on the first of June on the "City of Rome." On the morning of the 8th, the boat ran into the rock on which the lighthouse is built, and broke a hole in the bow twenty-four feet across. I got off at Queenstown, went across to visit Nicholas Grattan at Dublin, and to see two other surgeons there, then to Liverpool, and spent ten days with Thomas and Jones. At the meetings of the Congress in Berlin I gathered the news, and T. L. Stedman, from his room in the Kaiserhof Hotel, telegraphed it to New York. The *Medical Record* had twelve pages of twelve-hundred words each, two weeks before any other medical journal had a word. After the meeting Shaffer went to Switzerland, and I rushed back to New York, to be in time for the meeting of the American Orthopedic Association in Philadelphia.

Doctor Ridlon was the special guest of Arthur Steindler at the American Orthopedic Association Meeting in Washington, in 1933 when Steindler was president. Steindler in his usual unselfish manner made Ridlon the hero of the occasion. At a dinner for about twenty-five or thirty of us on the evening preceding the formal meeting, Doctor Ridlon was called upon to recount some of his early experiences in the Association. As he often did when reminiscing, he told several stories about his relations with Thomas and Sir Robert Jones. One of the best, because it reveals so much of the character of the two men as well as their relationship to each other, was the account of Robert Jones lifesaving contribution to Doctor Ridlon's bank account sometime

after he went to Chicago. This was in about 1891 or 1892, when Doctor Ridlon was having a battle to establish himself and his family in Chicago, and set himself up there in the practice of orthopedic surgery. He had become so much reduced in the matter of funds, and had made so little progress in the matter of practice, that he was badly depressed and discouraged, and wrote to Liverpool telling more or less exactly how he was situated, and how he felt. Naturally, he did not ask Robert Jones for money, but by return mail, as fast as the mail could travel in those days, he received a check from Liverpool for a thousand dollars. This was quite sufficient to turn the tide as far as Ridlon's affairs were concerned, and while it was not followed by further financial aid, Robert Jones made other and substantial contributions to Dr. Ridlon's professional and personal happiness. Especially during the prohibition years in the United States, Sir Robert was very generous of certain "comforts" via Scotland that Dr. Ridlon appreciated.

Doctor Ridlon and Robert Jones were leaders among those who bridged the gap between the old strap-and-buckle orthopedic surgeons, and the fine surgical operators we have at the present time. Doctor Ridlon did this not so much by his own efforts, as by his imagination in such matters, by the employment of competent consultants, and by the training of brilliant students who became fine operators. One need only mention Steindler, Ryerson, Eikenbary, and Lewin: a few of those who have done as good work as anyone in the surgical operative field. Robert Jones became a fine operator on his own account, and during and after World War I his surgical clinics attracted patients and visitors from all over the world. Orthopedic operators

have now gone so far in the technical field, there seems to be danger at times that they will forget the conservative fundamentals stressed by Thomas, Ridlon, and others.

For example, any deformity due to "unsoundness" that can be improved before or during operation should be corrected. Any distortion due to temporary conditions like poliomyelitis or joint disease should be splinted in correct position until maximum improvement has been accomplished prior to operation, and, finally, in every surgical procedure the patient should be protected by immobilization *in correct position* during operation and the entire period of post-operative care until maximum healing and function have been obtained.

In February, 1927, Doctor Ridlon sent me two of the wrenches designed and made by Thomas in Liverpool. He made use of these for bending and shaping the irons that he put into his heavy spine, hip, and leg braces. These wrenches are very heavily built with prongs that take hold of the irons, and long handles that enable very heavy pieces of strap iron to be bent in any shape desired. The prongs or forks which take hold of the iron are adjustable by means of ratchets and screws, so that they can be made stationary in any position, or locked so that they can be worked forwards or backwards during the time that they are applied to the brace. They are much heavier than similar wrenches that we use at the present time, but were employed with great dexterity by Thomas, as Doctor Ridlon described his methods to me.

In a letter to me from Newport, May 31, 1928, Doctor Ridlon said "Irons" was the word that Thomas used for his splints and braces, and Jones continued its use without a thought because Thomas used iron. In

most of his braces iron was far better than steel, because it was more easily fitted, and not brittle. You can only with difficulty get any bracemaker to use iron nowadays for he has none in his shop.

The contribution to the literature of orthopedic surgery which Dr. Ridlon esteemed most (though I think not his best) was his address to the New York Academy of Medicine of March 3, 1904, on the replacement of congenitally dislocated hips. This was an excellent review of the entire subject and of his own experience; but also a blast at Lorenz of Vienna, his method, his American tour, and especially his claims and promises with a considerable deficiency as to results.

Out of ninety-four hips done by Dr. Ridlon he claimed sixty-one good results with ten perfect replacements. As to the poor results—some operated upon later by Lorenz—Dr. Ridlon was quite willing to share the responsibility though he disapproved of Lorenz, and—more or less—"all his works."

Dr. Ridlon's later years were less happy than his friends could have wished. Before he left Chicago, most of his practice drifted away to younger men who —Dr. Ridlon felt—should have sent all his patients back to him. This was, of course, impossible. He left the Home for Destitute Crippled Children with the feeling that some members of the staff and the trustees had forgotten his influence in the organization and his long service to the hospital.

But he had his trusty typewriter, and with that he kept up a wide correspondence. Also he wrote and rewrote pages of "Memories" with his own autobiography and a biography of Thomas in mind. Both his purpose and his industry wavered a good deal. On October 3, 1928, he wrote to me about a grandchild

with a broken arm that he had been out to Milwaukee to see. He said:

Gaenslen got a good enough replacement at the first setting—but tried four times more. I was satisfied to leave it as it was. We had a good day at Madison, and the Dean asked me to give a talk on the way to Rochester (for the Annual Orthopedic Lecture at the Mayo Clinic) when I go there on November 19th. As for the *Memories,* (Dr. Ridlon was then seventy-six) they are not intended for publication during my lifetime, if ever—just something to leave to the children and grandchildren.

One of Dr. Ridlon's "pet peeves" was to be found in the rather voluminous literature—emanating mostly from Boston—in regard to abdominal ptosis and lumbosacral and sacroiliac strain and arthritis. As an informal critic he gained some reputation for his championship of senna tea for these low back conditions, but there were some doubts. On November 8, 1922, (at age seventy) he wrote to me from Newport:

For the last three weeks I have been done up with lumbago or sciatica, many days so that I had to have help with my shoes. But I am better the last few days—thanks to senna tea or the grace of God, or something.

The presentation of Dr. Ridlon's portrait (by Bohnen) to Mrs. Ridlon and to him on his 71st birthday, November 24, 1923, was a high point in his career for Dr. Ridlon, and for many of us—his pupils and friends. Dr. Ridlon's sometimes rather formidable exterior was noticeably softened on that occasion. He said that he was happy to believe what he had always hoped, that his pupils, his contemporaries, and even many of his competitors were his friends.

The portrait hangs now in a favorable location in

the Church Memorial Library at Northwestern University Medical School where it rests, as Napoleon's ashes do, "among the people he loved most."

While Dr. Ridlon was critical, sometimes violently so, of unwarranted assumption or sham, he was quick to champion or defend those who were otherwise "qualified," even if in some respects at fault, in the eyes of the elite in orthopedic circles. Dr. Ridlon championed the cause of Hibbs until he was elected to the American Orthopedic Association, and defended Albee (against Boston) even when Albee appeared in a national popular magazine and made it difficult for us all to do so. Dr. Ridlon was being "razzed" about this at a meeting of the Boston Orthopedic Club (Jan. 14, 1929) at which, however, he, Sir Robert Jones, Dr. Freiberg, and Professor Putti were elected honorary members and Steindler a corresponding member.

In a letter from Dr. Ridlon on December 6, 1929, he indicated that at seventy-seven he could still "take it" (as the slang phrase has it) as well as "dish it out." He had been to New York to hear a lecture by Steindler, followed by a luncheon and dinner at the Commodore "with plenty of booze at both." Dr. Ridlon's letter stated in part:

> There were sixty-five at the dinner, and I told stories and got laughs till I felt like "the belle of the ball." There were more than twenty letters and telegrams. The one from Sir Robert read, "Heartfelt congratulations on your seventy-seventh birthday. You are one of the truest and best beloved friends it has been my privilege to have. Wish I were with you to recall our early struggles and tell you how much I owe to your splendid inspiration. My love to you and your dear wife." Steindler sent me a subscription to the Literary Guild and Hammond sent me two bottles of Scotch and two of American whiskey. (What a birthday for age seventy-seven!)

When Professor Ernest W. Hey Groves was president of the Association of Surgeons of Great Britain and Ireland, he invited me (H.W.O.) to be present (I was not permitted by the rules to present a paper) and to take his own place in closing a half day discussion on osteomyelitis and compound fractures. Dr. Ridlon's comment in a letter (March 6, 1930) was:

> I have been worried about your going all alone to the Bristol meeting. I have just had a reply from Robert Jones. He says that in the early days, Hey Groves attacked the Thomas principles but that after Robert Jones (note that!) had him appointed to the orthopedic service during the war (1916), he changed his principles of fracture treatment—he is an honest man.

And so I found him. He and other British surgeons, including Lord Moynihan, were cool but cordial, and after I read my tribute to Hunter, Lister, and Thomas, and demonstrated by operation on an old leg fracture at the Bristol General Hospital,[17] one of the surgeons said, "it's plenty of pins for me."—they were my friends, and said so!

Dr. Ridlon disapproved of the organization of various subsidiaries and subordinates of the American Orthopedic Association as they came along. After we had the Central States, Orthopedic Section of the A.M.A., and the Robert Jones Club, and the American Academy was proposed, he became depressed about the old parent organization, and proposed that the American Orthopedic Association be abandoned.

With the growing interest in orthopedic surgery, however, and especially after Dr. Ridlon attended Steindler's meeting at Washington in 1933 (at age

[17] See *British Journal of Surgery*, October, 1930, I, page 87.

eighty) he became as enthusiastic as ever about "the old crowd."

As Steindler's guest on that (and many an other) occasion Ridlon was again "the belle of the ball" and entirely up to the rôle. His account of Robert Jones' life saving contribution to Mrs. Ridlon and himself at the time when they were in dire straits—just starting in Chicago—was a really dramatic tale.

When the first American orthopedic unit under the leadership of Colonel Goldthwait, left Liverpool in May, 1917, we went direct to London. We arrived there at 3:00 p.m., on May 29. We had already been received formally, but very cordially by Sir Robert Jones, at our Liverpool landing, and in London we were invited at once to an afternoon at home by Mr. and Mrs. Walter H. Page, at No. 6 Grosvenor Square West. We were established at the Curzon Hotel just off Picadilly, and near Dover Street, where we were made quite comfortable, both as to quarters and food. Within a day or two, we were entertained at the Yacht Club by Sir Robert Jones, who gave a dinner to which a number of the London surgeons, as well as ourselves, were invited. An incident illustrating the readiness and tact of Sir Robert Jones occurred on that occasion. In violation of established custom in Great Britain, a young American officer started to light a cigarette at the end of the first course of the dinner. Sir Robert rapped sharply on the table, and brought everyone present to his feet to respond, at that early stage of the dinner, to a toast "to the King." When we had been seated after this toast, Sir Robert Jones gave his charming smile around the table, and announced that anyone who wished to do so might smoke. It was a source of some anxiety to many of our British hosts that Ameri-

cans insisted upon smoking not only cigarettes, but even cigars in the course of a meal. Like many other British customs with regard to food, drinks, and smoking, we required some time to learn what the conventions required. I was called away from a dinner at a private home, during the time I was in Cardiff one evening, by an emergency at the hospital. My host called for his pony and cart to take me back about two miles to answer the call, and as he accompanied me to the front door, he gave me the cigar I was supposed to have at the end of the dinner. I paused briefly at the door as I was leaving, and started to light the cigar, but he stopped me at once and said: "My dear chap, you must not light that cigar now, and smoke it on the way back in the open air; you must wait until you are comfortably settled at home, and smoke that cigar at your leisure, because *it is a very good cigar.*" Naturally, I was glad to comply with his suggestion.

After Dr. Ridlon passed eighty, and was having increasing difficulty with his infirmities—financial as well as physical—he found that he could not go on with his writing. His experiences and his work had been important—as he well knew, but he finally gave up even the project for a volume of collected papers. This would have been very creditable but already his reprints and cuts were being dispersed, and his notes becoming more confused all the time. Then he proposed (in April, 1932) that he should make a tour visiting thirty or forty of the men (he had a list) "boarding around like the country school teachers used to do," and have all these men talk and ask questions—and each write a chapter. It was a grand idea for the old doctor to think about—but it never came off.

As Dr. Ridlon often admitted, and the rest of us

found out, much of the material he typed after he settled down at Newport with his memoires in mind was not "fit to print." Ridlon was facile as to expression, and truthful as to facts, but too literal and emphatic as to the unpleasant characteristics of his less favored contemporaries.

That he could be picturesque, however, without doing any harm is evident from the following about Ansel G. Cook of Hartford, of whom he was very fond:

> While Cook was stationed at San Antonio, the tailor there told him he had exactly the same measurements as General Pershing; so Cook ordered two extra uniforms! When the King of Siam came to New York for a cataract operation, Cook hurried down to have the same surgeon do his. Now, when Robert Jones dies of heart disease, Cook, true to form does the same. But he was one of the most lovable men I have ever known.[18]

After all, Dr. Cook had made shoes and foot braces for Presidents Roosevelt and Taft, and had a feeling for celebrity.

When I was on the *S.S. Washington* on the way to the "Societe Internationale de Chirurgie Orthopedique" in London, and the British Medical Association in Dublin, with Albee, Campbell, and Henderson, I wrote Dr. Ridlon a long letter to give him all the news. In it I criticized, at some length, a book just out, on the history and literature of orthopedic surgery. Some quotations from his reply (July 19, 1933) will indicate his feeling about carelessness in handling orthopedic matters, and some other angles on the literature of the moment. He said:

> Your letter from the *S. S. Washington* just came. I too fell for that book of Bick's, and paid $1.50 for it which is no

[18] From a letter, Feb. 7, 1933.

small matter to me these days. When I noted the errors in spelling, grammar, and punctuation—and facts, I sat down and wrote a review. Dr. Brackett of the *Journal of Bone and Joint Disease,* replied, "It was worth writing the foreword to Bick's book to get your comment. It would make a good critique for the Journal. I must acknowledge that I had a distinct shock when I saw the way the book was printed." Dr. Ridlon sent a copy of the book and of his "Critique" to Frederick Watson, but as far as I know the Ridlon review was not published. An improved *Source Book* was written by Dr. Bick in 1937. The latter contained Dr. Ridlon's name!

At age eighty-two Doctor Ridlon was elected president of the Newport Medical Society, which pleased him very much. On May 17, 1934, he wrote to me, "I am president of the Society this year and had Hammond down last night to tell us about the latest advances in orthopedic surgery. He gave your method a grand boost!"

Doctor Ridlon had assured me in about 1923, that in the plaster-of-Paris infrequent dressing method I "had something" and "not to let anybody talk me out of it."

The more formal biographical material regarding Thomas, Ridlon, and Jones will be found in the introduction.

For the conclusion the following "Supplement" from Doctor Steindler serves both as an interpretation and a tribute to all that has been said about the professional work and personalities of these heroes of Orthopedic surgery.

To Doctor Ridlon, especially, I join with Steindler in adding my final word of appreciation and affection.

SUPPLEMENT

Ridlon and His Share in Molding Orthopedic Surgery

by ARTHUR STEINDLER, M.D.

IN THE HISTORY of orthopedic surgery of the second half of the nineteenth century, John Ridlon may be said to represent the connecting link between the American tradition and the rising British influence of such masters as Hugh Owen Thomas and Sir Robert Jones.

It is difficult for me to illustrate the exact position which Ridlon occupied in this merger of fundamental British ideas with the American train of thought. He brought home from his pilgrimages to Liverpool certain ideas which were not entirely in consonance with those of his American orthopedic progenitors. Ridlon made his first trip abroad to see Thomas as a young man of thirty-five, in the year 1887. Anyone who has known Ridlon's temperament and character will not be surprised to learn that when he returned from Liverpool in 1887, inculcated with the new ideas by Thomas' teachings, there arose sharp differences between him and his superiors. Dr. Shaffer, in the somewhat vin-

dictive manner of his time, caused Ridlon to lose out in his former position, and subsequently prevented his appointment as a professor of orthopedic surgery; a circumstance which resulted in Ridlon's leaving New York and moving to Chicago.

One only needs to read Ridlon's own remarks to realize how deeply impressed he was by the work of Thomas when he first visited his office in 1887.

Frederick Watson, the biographer of Sir Robert Jones, remarks upon Ridlon's astonishment when he witnessed Thomas' examination of one hundred and forty-six patients in one morning. There he saw also forcible reductions of the shoulder joint and fractures *of malunited wrists, performed without anesthetic*—this refusal to use a general anesthetic was not so much due to Thomas' indifference to inflicting *pain,* as to his fear of losing the patient by *shock.* We must not forget that these were the days before the use of local anesthesia. At any rate, Ridlon, according to his own report, was greatly impressed with the strength and skillfulness with which these manipulations were performed by Thomas. They extended not only to refracturing cases of malunion, but also to the correction of such conditions as rachitic bowlegs and others.

Dr. Ridlon's second visit to Liverpool was in 1890 where he renewed his friendship and allegiance to Thomas, who at that time was already in declining health. In fact, Thomas passed away on the sixth of January, 1891.

Dr. Ridlon's acquaintance with Sir Robert Jones dates back to his first visit to Liverpool in 1887 when Jones was a young man (he was five years younger than Ridlon) and was working in Liverpool with his distinguished uncle, H. O. Thomas. Frederick Watson

tells us that Robert Jones' rise in the profession coincided with the ship canal project in which he was offered the position of surgeon with a substantial salary. This, however, he declined because of his desire to attend to his increasing practice; but he accepted a sort of medical supervision over the other practitioners engaged in the project.

As a result of their acquaintance and mutual esteem, Ridlon and Robert Jones cooperated, between 1892 and 1893 on a number of articles, both in this country and in England, dealing with orthopedic conditions of hips, spine, knees, shoulders, elbows, and wrists. The book of lectures on orthopedic surgery by Ridlon and Jones appeared in 1899 with the purpose of preserving the things of most value in the teachings and practice of H. O. Thomas.

I believe that the years 1892 and 1893 present the halcyon days of Ridlon's classical work. In 1892 there appeared the paper (by Ridlon and Jones) on the pathology of tuberculous joint disease, simultaneously in the *Provincial Medical Journal* of Liverpool and in the *North American Practitioner*. The pathological concepts of disease presented (and all the illustrations) rested upon the work of previous German pathologists, especially Krause; but even at that early time, the description of the pathological process varies very little from that in the present day textbooks. The great clinical sense of both men, who had to rely upon physical examination without the benefit of radiography, becomes particularly apparent in their skill in differential diagnosis. I refer, also, to the papers on spondylitis by Ridlon and Jones (*Journal of the American Medical Association*, Dec. 10, 1892) and to that on sacro-iliac disease which appeared in the *Annals of*

Surgery in March, 1933. The descriptions are of classical clearness and worthy of comparison with Paget's or Pott's representations of earlier years.

Ridlon shows the same sharpness of analysis in subsequent publications on other subjects such as his paper on *Congenital Dislocation of the Hip,* which appeared in *Surgery, Gynecology and Obstetrics* in June, 1906.

On this occasion, he calls attention to the so-called spontaneous dislocation of the hip. As we see it now, it is the story of the postpartum dislocation, involving the large class of patients in which the disease starts with subluxation and gradually proceeds to complete dislocation. Putti much later emphasized this point and corroborated it by excellent radiographic evidence. Ridlon, to prove his point, selected a small group of delayed dislocations. In one case no evidence was seen until after three years. He also cited cases of so-called normal contralateral hips in unilateral dislocation which went on to complete dislocation facilitated by the abduction position of the other hip, and presented cases of gradual dislocation of so-called normal hips. He contended that in unilateral hip dislocations the apparently normal hip is by no means normal. When reading these lines one feels himself transposed to the much later period of Putti, Hilgereiner, and others who emphasized the abnormality of the so-called normal hip in unilateral dislocation. What interests us particularly is that Ridlon already knew and had his attention focused upon cases of spontaneous reposition (two cases) and particularly are we astounded by his statement, so amply corroborated by later students of congenital dislocation of the hip, that the abnormal hip may become dislocated at any period of life up to fifteen years and later without traumatism and without tearing of the capsule.

While we are on the subject of congenital dislocation of the hip, we might well illustrate the rôle that Ridlon has played in the early years before and after the first visit of Lorenz to this country.

Let us remember that, long before this event, namely, in 1889, Ridlon had reported a case of congenital dislocation of the hip treated by traction (*Medical Record,* 1889). In this he failed. But since 1892 up to December, 1900, he attempted to replace dislocated hips by a maneuver in which the femur was abducted, flexed, and the head lifted toward the acetabulum, rotated from side to side, while the pelvis was held down by the other hand. As he remarks later (*Journal of Orthopedic Surgery,* 3:8:365, August, 1921), obviously only a very easily reducible hip could be reduced this way.

Lorenz' first visit to this country occurred in 1902. The older generation still remembers the unparalleled publicity and the subsequent exorbitant claims of success by Lorenz which characterized this first visit.

It was in 1904 (New York Academy of Medicine, March 2, 1904) that Ridlon definitely stated that the number of perfect anatomic replacements were few and certainly would not exceed ten per cent; at the same time he challenged Lorenz' claim of fifty per cent perfect replacement and eighty per cent good results.

A controversy which started in these days and is still not settled, was the question of the originality of Lorenz' method as against Paci's. The latter was sponsored by G. G. Davis (*American Medicine,* August 29, 1903) who stated that apart from the excessive violence, extension, and tearing of the muscles, the Lorenz method is the same as that devised and reported by Paci in 1894. But the significant point is that Ridlon realized already at this time that the extreme force

which Lorenz was using gave deplorable results and he set out to mitigate it by his own modification of the original Paci method.

We notice his criterion for the accomplished reduction was a tightening of the hamstrings, and he distinguishes between the shallow and the good acetabulum, according to whether the hip could or could not be brought from full adduction to ten to twenty degrees of abduction without redislocating. This criterion still holds good today and has in later years attained a still greater significance as far as the prognosis of the reduction is concerned.

But most important of all, he recognized that whenever the head is not well buried in the acetabulum, which means concentric reduction, the result is sure to be an anterior transposition (a supracotyloid displacement) or a relapse into complete posterior displacement. In other words the concentric reduction of the head is the only assurance of maintaining reduction. It is characteristic of Ridlon's way of thinking that he gradually deviated from the more forceful and brutal methods of the day to the perfection of his own and much refined modification, and that he always deplored the use of excessive force. There were other inducements for forceful maneuvers such as the so-called Bartlett machine (*Chicago Medical Record,* September, 1905) intended to force reduction of the head by means of a powerful lever traction.

After Lorenz' second visit in 1904, the opinion rose in favor of the open operation for the difficult cases and choice had to be made between the use of increasing force in the bloodless maneuver or the open operation. Hoffa was the first exponent of the open method. He had visited this country and operated upon patients

here a few years before. Hoffa reasoned that one should not make more than two or three attempts at closed reduction and, if one failed, the open reduction was indicated. He further stated that one should not expect from closed reduction more than 7 per cent of bilateral and thirty per cent of unilateral cases to be concentrically and perfectly anatomically reduced.

At this time, Ridlon took up with Bartlett his very powerful stretching machine, and he thought it was a good appliance; however, he refrained from use of the machine because of the exorbitant demand Mr. Bartlett had made for permission to use it.

From that time on, Ridlon used consistently his modification in which he usually refrained from the brutal tearing of the adductors. He insisted upon a careful, well controlled maneuver in which the fingers of one hand placed in proper position should give information as to the position of the head during every phase of the maneuver. I think it is to his great credit that he restricted his indications to such an extent that he was able in later years to point to a gratifying percentage of cures. It may be the place now to hear him summarize his great experience in the treatment of congenital dislocation of the hip. For that purpose I may quote three articles which appeared in his later career, the last of them in 1933 shortly before his death.

In 1921 we find him discussing the whole history of the treatment, including Lorenz' treatment, whose claim of priority and whose percentages of end results he considered equally unwarranted. About this time, Z. B. Adams postulated certain restrictions in the use of reduction maneuvers, the most important of which were that such maneuvers would not be successful after the age of six, that the position of the hip after reduc-

tion should preferably be that of Lange, which means ninety degrees abduction, ninety degrees flexion and inward rotation; that both legs should be kept in casts and remain there for eight months; and that with such a program a respectable number of good functional hips would be obtained even if not anatomically perfect. Z. B. Adams himself claimed that only ten per cent were anatomically reduced.

Now we find Ridlon in contrast to this, practicing his reduction in the Lorenz' primary position, namely, ninety degrees abduction, ninety degrees flexion, and forty-five degrees outward rotation, so that as he said the back of the thigh looks downward and the outer side of the thigh looks backwards (*Rhode Island Medical Journal,* September, 1933). We see him selecting his cases carefully so that he could claim for unilateral dislocations at the proper age (dislocated backward and upward) one hundred per cent reduction; for unilateral cases dislocated upward, seventy-five per cent; and finally for unilateral cases that were dislocated upward and more forward, fifty per cent of successful reduction (*Staff Meeting Mayo Clinic,* March 27, 1929).

By 1933, when Ridlon wrote his last paper on this subject, a number of things had happened which radically changed our views in regard to original Lorenz-Paci maneuvers. For one thing, Galloway of Winnipeg, for some years had advocated the open operation as the method of choice in all cases; although he had not up to that time published his results in any convincing manner.

Then Z. B. Adams brought from Bordeaux, France, the manipulative methods of Denucé. This method Ridlon considered the same as his own, except that Denucé carried the flexed knee to the opposite shoulder, which Ridlon considered unnecessary.

In the following years Putti in Bologna advocated the earliest possible diagnosis and earlier operation, an opinion which is now generally accepted. It is a pity that Ridlon did not give his opinion on this point. It would have been invaluable. One thing is certain—he did not oppose the early operation although he always considered between two and three years the optimum age for reduction.[1] Finally we must not forget that during this time or somewhat earlier, osteotomies were performed on the femur by Sherman in San Francisco, and revived later by Hibbs, in order to overcome the backward rotation or the anterior convexity of the neck. Ridlon took definite exception to this method. He considered it unnecessary and absurd. He felt certain that the osteotomy should be performed only rarely. Advocates of this method seemed to act on the assumption that all necks are twisted with forward convexity, a point which Ridlon always denied.

Subsequent events have fully justified Ridlon's stand on treatment of congenital dislocation of this hip possibly with three exceptions. *First:* we accept now Putti's view of earliest diagnosis and reduction. *Second:* we recognize the danger which lies in forcible reduction to the head in the form of osteochondritis, and arthritis, and consequently, are more conservative in our reduction maneuvers. *Finally:* we have learned from Hilgenreiner and others that the formation of an adequate acetabulum calls for concentric reduction, for development of active abductor muscles, and for delaying the weight bearing after removal of the cast for a certain

[1] Dr. Ridlon was influenced in this opinion by the necessity, as he saw it, for prolonged care in plaster-of-Paris casts. These casts in infants, had to be changed too often if the period of care in diapers had not been passed. (H.W.O.)

time until the weakness of the abductor muscle has disappeared (Freund, Steindler, Kulowski, Ponseti).

Ridlon's Ideas on the Treatment of Clubfoot

Here we find him an adherent of Thomas' teaching of repeated manipulation. His method at first consisted of repeated stretching with a Thomas wrench but he soon objected to the cruelty of the method. Insofar as I have been able to observe, his manner of correcting clubfeet, while still by force, was more conservative and more considerate of tissue reaction than that of some of his contemporaries, and especially Lorenz. As is seen in his paper (*Illinois Medical Journal,* February, 1906) he was, for his time, remarkably conservative and confined himself to manual stretching soon after birth, which was rather vigorously repeated at least once a day, and, later, he would apply the Judson steel bar or a Thomas retention splint.

This splint consisted of a footplate with a posterior upright extension from heel to garter level. It was to be used as soon as the varus had been overcome by previous maneuvers.

More resistant cases were treated more forcibly with Thomas' wrench or the Koenig wedge shaped block. It is of particular interest to learn of Ridlon's attitude toward the tenotomy of the tendo achilles. He and Eikenbery credit the first performance of this operation to a man named Lorenz in 1784, for the correction of clubfoot and it is a fact that the history of this tenotomy dates back to before the time of Stromeyer and Dieffenbach who performed it first in 1831. It is said that the first operation, in fact, was done in England by M. A. Petit (1799). At any rate, Ridlon said that the operation had been performed in this country for

seventy-five years, this is, since 1834, when David L. Rogers performed it, but that it was really introduced in this country by W. Detmond in 1840. The point is that Ridlon and Eikenbery, his collaborator, both believed that it is performed far too often. We must admire this observation since it bears out exactly what we think at the present date. This also applies to their view on the tenotomies of the supinators and the stripping of the ligaments on the inner side of the foot, procedures which must be recognized as the forerunners of the methods of Ober and Brockman.

On the whole, summing up Ridlon's method of clubfoot treatment, we must recognize a very definite trend toward conservatism, at a time when radical procedures abounded. I have seen him use force amply in manual correction, but I have seldom seen him use the Thomas wrench or any other forceful instrument including the Grattan osteoclast for bowlegs, an instrument which he had advocated in earlier years. I cannot but observe also, that his ideas on the etiology of clubfoot were peculiarly advanced for his day. For instance, he recognized and valued the theory of H. W. Berg of New York, to the effect that the varus deformity is an early and normal embryonic position and that it is one stage of development of the normal and healthy fetus. But normally it is corrected by the gradual and subsequent outward rotation which places the soles of the feet against the uterine wall. This then neutralizes the hitherto existing varus or equinovarus deformity. This is the theory that Ridlon accepted and I should like to point out the similarity of this concept to that promulgated much later by Max Boehm who attributed deformation of the ordinary clubfoot to a failure of a readjustment in the embryonic development of the foot.

Ridlon on Scoliosis

Anyone who has witnessed the hectic and radical ideas on scoliosis treatment in this country promulgated by E. G. Abbott, MacKenzie Forbes, Hibbs and others, will be interested in what Ridlon thought of this condition as early as 1892 (*Medical Record,* September 17, 1892). For one thing, he advised certain mobilizing maneuvers combined with muscle developing exercises. He said, "Scoliosis under treatment by forcible redressement and appropriate exercises will not grow worse but will slowly improve, whereas, spondylitis under the same treatment will grow worse." His ideas on the whole were that mobilization plus appropriate exercises will lead to something like control. The question as to how much mobilization and how much in the way of exercises are necessary and in what ratio these two types of treatment are to be applied he left unanswered and we know is still in a state of considerable confusion today, fifty-four years later.

Ridlon on Infantile Paralysis

Probably the most interesting sidelight on Ridlon's clinical astuteness can be found in his attitude toward infantile paralysis (*American Journal of Clinical Medicine,* April, 1912). He was fully aware, even at that time when diagnosis was still inaccurate and many cases remained undiagnosed, that about twenty-three per cent of the victims recover without paralysis, whereas fifty per cent remain permanently paralyzed and twenty-five per cent die. Diagnosis was still uncertain and the percentage of abortive and spontaneously cured cases must have been much higher.

Ridlon recognized full well that spontaneous im-

provement takes place to some extent in almost all cases and that it occurs between six and eighteen months and sometimes much longer. Therefore, improvement is not necessarily to be credited to any or all of the therapeutic agents or agencies employed.

In regard to the treatment, he considered as one of the objectives, the prevention of early contractures. (This he got, in large part, from Thomas. H.W.O.)

He emphasized local heat for the hypersensitiveness applied consistently, but he further accentuated that as soon as the sensitiveness is over, active and passive as well as resistant movements should be instituted. In this respect he is a follower of Lovett, who also emphasized the application of heat for the spasm and sensitiveness and the active and passive and educational movements for the paralysis. It is really hard to understand how some people looking for priority credit believe that treatment of active and passive motion are discoveries of the last few years.

What does he think of the use of braces? This is a question so much under controversy today. He said: Braces should be used only for two purposes; namely, to prevent deformities where they would develop if braces are not used; and secondly, to enable the patient to use his limbs and walk where he manifestly could not walk without them. In view of the fact that faddists have used the application of braces as an excuse to slander usual orthopedic practice, it is hard to explain where the idea of the indiscriminate use of braces by orthopedics surgeons could have originated.

Ridlon on Fractures of the Neck of the Femur

Considering that fractures of the neck of the femur occupy today a substantial portion of the interest of

orthopedic surgeons and traumatologists it must be interesting to learn what Ridlon's ideas were as early as 1892 (*Chicago Recorder,* August 15). These were the pre-x-ray days. Tremendously impressed, as Ridlon was with H. O. Thomas' ideas, it is not surprising to see him applying the Thomas hip splint for fractures of the neck of the femur. This instrument, he says, "secures posterior support of the fracture, keeps fixation without compression, allows the patient to be lifted, favors cleanliness, admits fixative traction, and can be applied without moving the patient." In his opinion it replaced the plaster-of-Paris which he recognized to be impractical in a good many cases. He left the patient in bed for four to six weeks after all pain had ceased, and then permitted him to be about on crutches. This early ambulatory treatment was perhaps the greatest advantage the method offered. This was at a time before the necessity of reduction was emphasized by men like Whitman and before the x-ray picture showed that there is no definite union possible unless the fragments are in good position. It has been shown subsequently, that the splint method is inadequate because it does not furnish assurance of reduction. We must not forget, however, that a good many cases of hip fractures occurring in the lateral neck or in the intertrochanteric region and also cases of adduction fracture of the neck no doubt had resulted in union under this method.

When we consider that the other methods in vogue at that time were bedrest, traction, and position only, we must give Ridlon the credit that of all these methods, he employed the least inadequate, and obtained a cure at least in a moderate percentage of cases.

Ridlon on Tuberculous Disease

This shows more than any other the influence of H. O. Thomas. In tuberculous hip disease and in chronic hip disease in general, the paramount instrument of choice, of course, is the Thomas splint of which, and of its use, Ridlon gives such an accurate description. To our modern eyes the Thomas hip splint may appear simply as a rather primitive piece of machinery. Nothing is further from the truth. The Thomas hip splint of that day did not represent a new mechanical device but it represented the application of a new and revolutionary principle. It broke with the old system of traction as it had been applied by the traction splint of Davis, Sayre, Taylor, and others, and demanded immobilization as well as the elimination of weight bearing. Above all things it is an instrument designed to enable the patient to resume an ambulatory life.

In 1889 Ridlon stated that in not one of the traction splints in use at that time in this country was there a constant and uninterrupted traction obtained during locomotion. He believed firmly that the push and pull action of these splints during locomotion was just the opposite of what the proper treatment should be.

We should call this idea rather an early and courageous emancipation from the prevailing traction principle, an emancipation in favor of the strict immobilization of H. O. Thomas. We refer you to a report of Ridlon (*New York Medical Journal,* October 4, 1890) where we find him entirely committed to immobilization and elimination of weight bearing as he had seen it in Liverpool in 1887. He adheres to the Thomas principle applied to hips and is strongly opposed to the earlier traction treatment method.

Twenty-four years later in 1914 (*Pennsylvania Medical Journal,* November, 1914), he reiterated his principles. Yet he was not a stubborn adherent to any method and was no fanatic on splints or any mechanical device but he stated that, "for the best results one must have sufficient experience to know when to modify and when to change the plan of treatment." We believe it is one thing to accept an instrument like the Thomas splint as a convenient apparatus and quite another thing to recognize the Thomas splint as an embodiment of a new principle in the cure in chronic joint diseases, so different from the principles of the past.

We may say the same thing of Ridlon's treatment of Pott's disease. Of course, he held fast to the principle of immobilization and recumbency and he had his own very sound criteria which determined the abandonment of the recumbent position and the assumption of ambulatory treatment. On the whole, these criteria were no different from what they are now, at least, from what they are now in careful and conservative surgery. Ridlon had an uncanny sense of progosis. It is particularly apparent in his discussion on Pott's disease, where the acumen of observation and his keen prognostic foresight becomes particularly apparent. For instance, take the point of compression paraplegia or the prognosis as to the increase of the deformity. He believed firmly that recumbency is the supreme measure to control the deformity and he states that when deformity has occurred it cannot as a rule be remedied. Remember that this was before the fantastic attempt which Calot advocated to correct deformity by the use of brute force and before the attempts of Finck of Charkow, to correct the deformity in recumbency by gradual hyperextension. Although we do not find it expressed

in so many words we cannot help but feel that his attitude was simply a forerunner to our present day knowledge that deformity as such is a manner of cure and should not be broken up by forcible means and that the ultimate goal of a tuberculous spine is the contact of the opposing vertebral surfaces and the blockage by healthy bone.

Whoever studies Ridlon's writings or had the opportunity to observe him in his activities, cannot but admire his moderation and his breadth of vision which would not permit him to adhere to any one method at all times and under all circumstances.

He believed, "That there is a time for everything and a season for every purpose under the heavens." He felt that for the best method one must have sufficient experience to know when to modify and when to change the plan of treatment. This is best illustrated in his attitude toward *surgical treatment of tuberculosis.* We have his report on patients with tuberculosis of the knee. Tuberculosis of the knee is considered by many to be entirely a surgical problem. This indication for surgical procedure made without any further consideration of the merits of the case, he deprecated deeply, and he had no patience with blatant claims or the arrogant didacticism of some radical members of the profession, who preached operation for every case of any age or at any time. It was a great satisfaction to him to be able to produce two cases of complete cure of tuberculous knee disease with retention of full motion. In both of these cases the diagnosis of tuberculous knee disease was secured by the fact that the other knee was operated upon and was found to be tuberculous.

The critics of this period after his return from Liverpool, that is, in the nineties of the last century, may

well point out that diagnoses were made late and there was lack of pathological proof in many instances. From the same point of view they may object to deductions on prognosis drawn upon what might seem to be a scarce material and an incomplete followup. Nevertheless, we believe that for an all-round mastery of the clinical situation, Ridlon had few equals in his field. He combined the soundness and practical sense of H. O. Thomas with the vision and gentleness of Robert Jones. We must recognize in him his straightforwardness, sometimes bluntness, because it stemmed from an inherent passion for truth which, as with Thomas, tolerated no compromise. He had no patience with loose statements or with insincerity no matter from what source they came, and I have often seen him bitterly enraged when broad statements were promulgated in meetings without a background of experience. I have seen him many times break into unbridled wrath over such frailties and he had no hesitancy to jump with both feet into heated discussions.

Because of his sincerity and straightforwardness he had few enemies in spite of his bluntness, and he had many pupils and followers who have remained loyal to him and to his memory. Only to remember a handful: there is Eikenbary, of whom he used to say facetiously, he was the only man who knew how to put on a plaster cast besides himself: or E. W. Ryerson and Wallace Blanchard, his co-workers in the Home for Destitute Crippled Children; H. W. Orr, for whose achievement and for whose courage of conviction he always had the highest regard; J. L. Porter was his faithful associate and co-worker for many years; Charles M. Jacobs, Charles Parker, and Henry B. Thomas, who were with him in the home for crippled children for

many years; Philip Lewin was for a long time associated with him in his office and hospital work; and Elvin Berkheiser followed him as a faithful associate. As for my own undeserving self, I hold Ridlon's name sacred in affection and admiration.[2] All of us, and more, were there in 1923 at the presentation of his portrait (by Bohnen) to him and Mrs. Ridlon. The occasion was a touching one never to be forgotten by those present.

When he died in 1936 at the age of eighty-four he left an inspiring memory to his pupils. More than that, so sound had been his teachings, so careful, so deliberate, so conservative, and so thoughtful had been his approach to the difficult subjects or problems of our profession, that I do not think anyone of us really believes his methods antiquated nor would any of us hesitate to take counsel with him in any situation if he were alive today.

[2] Dr. Ridlon esteemed no one of all his pupils as highly as Steindler—and Louise Steindler—one of his surgical nurses, when she and Steindler met and were married during the time when they were associated with him in Chicago. (H.W.O.)

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Dr. Ridlon said, "I went to see Thomas, in November, 1887; returned December 27th and took over the position of Attending Orthopedic Surgeon at St. Luke's in New York, Shaffer advancing to Consultant. The first Thomas hip splint in this country I made with my own hands in the cellar of my house, 337 West 57th Street, New York, and put on a little girl in the ward at St. Luke's that had made no progress with the traction splint. Somewhat later on, Shaffer discovered it and ordered me to take it off. I did not do it; and

so our row started which resulted in my not being reappointed at the end of the year, and the Phillippic of Thomas: "An argument with the Censor of St. Luke's Hospital." (Personal letter Jan. 1, 1927). *P. VIII, 70, 147, 189, 194, 202.*

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RIDLON, JOHN: (See Osgood, R. B., 1925) "It is very nice of you to take up the defense of the East for recognition in Orthopedic Surgery. Henry G. *Davis* was at one time as prominent in New York as *Sayre* and *Taylor* and *Bauer* of Brooklyn; and in the same class and fully as deserving were Edmond *Andrews* and David *Prince.* Both lived reputable lives and died in ethical sanctity. *Shaffer* and *Gibney, Willard* and *Lee,* are as deserving as *Bradford* and there are many the country over as deserving as Brackett and Goldthwait. In England *William Adams* was as great an influence as W. J. *Little,* and George Arthur *Wright* of Manchester did as much as MacEwan of Glasgow. Paul *Renard* was equal to *Hoffa.* My pet enemy Lorenz, is more worthy of "undying fame" than many of Osgood's Gallery of Immortals. Perhaps, Osgood did not mention me because he did not think it necessary to do so before an audience in the West. I am quite content. Advertising is no longer of use to me. So long as I have the love of you boys among whom I have worked for a third of a century, I am happy:" (The above is a reply by Dr. John Ridlon to a letter from me, (H.W.O.) com-

menting upon some omissions in Dr. Osgood's lecture.) 1926.

RIDLON, JOHN: "Bradford was the first to prove that traction could not separate the joint surfaces of the hip. Then the swing began from traction with motion and traction without intended motion to immobilization. Thomas believed that 'protection'—from weight bearing—was essential. In 1890 I carefully observed 63 of his cases and made my report. The last paper Thomas ever wrote was to contradict my report on his cases, but I had observed these 63 patients and have questioned the parents when Thomas was not present, and I know." (Personal Letter from Dr. Ridlon, January 1, 1927.)

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THOMAS, HUGH OWEN: The principles of the treatment of fractures and dislocations. (Part VI of Contributions to surgery and medicine) 104 pp., 17 plates, H. K. Lewis, London, 1886. *pp. x, 37, 47, 130, 138,* (caliper splint) *pp. 142, 145, 148,* Thomas on shoulder reduction (illus.) *pp. 175, 177.*

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This Book

On the Contributions of

Hugh Owen Thomas of Liverpool

Sir Robert Jones of Liverpool and London

John Ridlon, M.D. of New York and Chicago

to

MODERN ORTHOPEDIC SURGERY

By

H. WINNETT ORR, M. D.

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